

# EXHIBIT H

PTO/AIA/15 (10-17)

Approved for use through 11/30/2017. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number.

<b>UTILITY PATENT APPLICATION TRANSMITTAL</b> <small>(Only for new nonprovisional applications under 37 CFR 1.53(b))</small>		<b>Attorney Docket No.</b> BEEL3004C/TL
		<b>First Named Inventor</b> Koen Simon Herman BEEL
		<b>Title</b> ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
		<b>Priority Mail Express® Label No.</b>

<b>APPLICATION ELEMENTS</b> <small>See MPEP chapter 600 concerning utility patent application contents.</small>  1. <input checked="" type="checkbox"/> <b>Fee Transmittal Form</b> (PTO/SB/17 or equivalent)  2. <input type="checkbox"/> <b>Applicant asserts small entity status.</b> <small>See 37 CFR 1.27</small>  3. <input type="checkbox"/> <b>Applicant certifies micro entity status.</b> See 37 CFR 1.29. <small>Applicant must attach form PTO/SB/15A or B or equivalent.</small>  4. <input checked="" type="checkbox"/> <b>Specification</b> [Total Pages <u>68</u> ] <small>Both the claims and abstract must start on a new page. (See MPEP § 608.01(a) for information on the preferred arrangement)</small>  5. <input checked="" type="checkbox"/> <b>Drawing(s)</b> (35 U.S.C. 113) [Total Sheets <u>6</u> ]  6. <b>Inventor's Oath or Declaration</b> [Total Pages <u>3</u> ] <small>(including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e))</small> a. <input type="checkbox"/> Newly executed (original or copy) b. <input checked="" type="checkbox"/> A copy from a prior application (37 CFR 1.63(d))  7. <input checked="" type="checkbox"/> <b>Application Data Sheet</b> * See note below. <small>See 37 CFR 1.76 (PTO/AIA/14 or equivalent)</small>  8. <b>CD-ROM or CD-R</b> <small>in duplicate, large table, or Computer Program (Appendix)</small> <input type="checkbox"/> Landscape Table on CD  9. <b>Nucleotide and/or Amino Acid Sequence Submission</b> <small>(if applicable, items a. – c. are required)</small> a. <input type="checkbox"/> Computer Readable Form (CRF) b. <input type="checkbox"/> Specification Sequence Listing on: i. <input type="checkbox"/> CD-ROM or CD-R (2 copies); or ii. <input type="checkbox"/> Paper c. <input type="checkbox"/> Statements verifying identity of above copies	<b>Commissioner for Patents</b> <b>P.O. Box 1450</b> <b>Alexandria, VA 22313-1450</b>  <b>ADDRESS TO:</b>  <b>ACCOMPANYING APPLICATION PAPERS</b>  10. <input type="checkbox"/> <b>Assignment Papers</b> <small>(cover sheet &amp; document(s))</small> Name of Assignee _____  11. <input type="checkbox"/> <b>37 CFR 3.73(c) Statement</b> <input checked="" type="checkbox"/> <b>Power of Attorney</b> <small>(when there is an assignee)</small>  12. <input type="checkbox"/> <b>English Translation Document</b> <small>(if applicable)</small>  13. <input checked="" type="checkbox"/> <b>Information Disclosure Statement</b> <small>(PTO/SB/08 or PTO-1449)</small> <input checked="" type="checkbox"/> Copies of citations attached  14. <input checked="" type="checkbox"/> <b>Preliminary Amendment</b>  15. <input type="checkbox"/> <b>Return Receipt Postcard</b> <small>(MPEP § 503) (Should be specifically itemized)</small>  16. <input type="checkbox"/> <b>Certified Copy of Priority Document(s)</b> <small>(if foreign priority is claimed)</small>  17. <input type="checkbox"/> <b>Nonpublication Request</b> <small>Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.</small>  18. <input checked="" type="checkbox"/> <b>Other:</b> Applicant incorporates by reference parent application no. 14/344,836 _____ _____ _____
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**\*Note:** (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).  
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

<b>19. CORRESPONDENCE ADDRESS</b>				
<input checked="" type="checkbox"/> The address associated with Customer Number: <u>23364</u> <b>OR</b> <input type="checkbox"/> Correspondence address below				
Name				
Address				
City	State	Zip Code		
Country	Telephone	Email		

Signature	/Thomas Lee/	Date	April 20, 2020
Name (Print/Type)	THOMAS LEE	Registration No. (Attorney/Agent)	66396

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*



## Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/17 (01-18)

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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FEE TRANSMITTAL		Complete if known	
		Application Number	
		Filing Date	April 20, 2020
<input type="checkbox"/> Applicant asserts small entity status. See 37 CFR 1.27.		First Named Inventor	Koen Simon Herman BEEL
<input type="checkbox"/> Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.		Examiner Name	
		Art Unit	
TOTAL AMOUNT OF PAYMENT	(\$ 2180	Practitioner Docket No.	BEEL3004C/TL

**METHOD OF PAYMENT** (check all that apply)
☐ Check ☐ Credit Card ☐ Money Order ☐ None ☒ Other (please identify): EFS Web

☒ Deposit Account Deposit Account Number: 02-0200 Deposit Account Name: Bacon & Thomas, PLLC

For the above-identified deposit account, the Director is hereby authorized to (check all that apply):

☒ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**
☐ Charge any additional fee(s) or underpayment of fee(s) ☒ Credit any overpayment of fee(s)  
under 37 CFR 1.16 and 1.17

**WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

**FEE CALCULATION****1. BASIC FILING, SEARCH, AND EXAMINATION FEES (U = undiscounted fee; S = small entity fee; M = micro entity fee)**

Application Type	FILING FEES			SEARCH FEES			EXAMINATION FEES			Fees Paid (\$)
	U (\$)	S (\$)	M (\$)	U (\$)	S (\$)	M (\$)	U (\$)	S (\$)	M (\$)	
Utility	300	150*	75	660	330	165	760	380	190	1720
Design	200	100	50	160	80	40	600	300	150	
Plant	200	100	50	420	210	105	620	310	155	
Reissue	300	150	75	660	330	165	2,200	1,100	550	
Provisional	280	140	70	0	0	0	0	0	0	

\* The \$150 small entity status filing fee for a utility application is further reduced to \$75 for a small entity status applicant who files the application via EFS-Web.

**2. EXCESS CLAIM FEES**

Fee Description	Undiscounted Fee (\$)	Small Entity Fee (\$)	Micro Entity Fee (\$)
Each claim over 20 (including Reissues)	100	50	25
Each independent claim over 3 (including Reissues)	460	230	115
Multiple dependent claims	820	410	205
<b>Total Claims</b>			
20 - 20 or HP = 0 x =			
HP = highest number of total claims paid for, if greater than 20.			
<b>Indep. Claims</b>			
4 - 3 or HP = 1 x 460 = 460			
HP = highest number of independent claims paid for, if greater than 3.			

**3. APPLICATION SIZE FEE**

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$400 (\$200 for small entity) (\$100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
74	- 100 =	/ 50 = (round up to a whole number) x		

**4. OTHER FEE(S)**

Non-English specification, \$130 fee (no small or micro entity discount)

Non-electronic filing fee under 37 CFR 1.16(t) for a utility application, \$400 fee (\$200 small or micro entity)

Other (e.g., late filing surcharge):

SUBMITTED BY			
Signature	/Thomas Lee/	Registration No. (Attorney/Agent) 66396	Telephone 703-683-0500
Name (Print/Type)	THOMAS LEE	Date April 20, 2020	

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	BEEL3004C/TL
		Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		
<p>The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.</p>			

## Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

## Inventor Information:

Inventor	1				<a href="#">Remove</a>	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Koen	Simon Herman	BEEL			
Residence Information (Select One) <input type="radio"/> US Residency <input checked="" type="radio"/> Non US Residency <input type="radio"/> Active US Military Service						
City	Eke	Country of Residence <sup>i</sup>		BE		
Mailing Address of Inventor:						
Address 1		Zandstraat 20a				
Address 2						
City	Eke	State/Province				
Postal Code	9810	Country <sup>i</sup>	BE			
Inventor	2				<a href="#">Remove</a>	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Yoav		NIR			
Residence Information (Select One) <input type="radio"/> US Residency <input checked="" type="radio"/> Non US Residency <input type="radio"/> Active US Military Service						
City	Komen	Country of Residence <sup>i</sup>		BE		
Mailing Address of Inventor:						
Address 1		rue de Ten Brielen 19				
Address 2						
City	Komen	State/Province				
Postal Code	B-7780	Country <sup>i</sup>	BE			
Inventor	3				<a href="#">Remove</a>	
Legal Name						

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	BEEL3004C/TL
		Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

Prefix	Given Name	Middle Name	Family Name	Suffix
	Filip	Josephine Johan	LOUWET	
<b>Residence Information (Select One)</b> US Residency <input checked="" type="radio"/> Non US Residency    Active US Military Service				
City	Knesselare	Country of Residence <sup>i</sup>	BE	

**Mailing Address of Inventor:**

Address 1	De Wijngaard 1			
Address 2				
City	Knesselare	State/Province		
Postal Code	9910	Country <sup>i</sup>	BE	
Inventor	4			<input type="button" value="Remove"/>
Legal Name				

Prefix	Given Name	Middle Name	Family Name	Suffix
	Guy		COEN	
<b>Residence Information (Select One)</b> US Residency <input checked="" type="radio"/> Non US Residency    Active US Military Service				
City	Aalst	Country of Residence <sup>i</sup>	BE	

**Mailing Address of Inventor:**

Address 1	Louis Camustraart 25			
Address 2				
City	Aalst	State/Province		
Postal Code	9300	Country <sup>i</sup>	BE	
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the <b>Add</b> button. <input type="button" value="Add"/>				

**Correspondence Information:**

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).	
<input type="checkbox"/> An Address is being provided for the correspondence Information of this application.	
Customer Number	23364
Email Address	mail@baconthomas.com <input type="button" value="Add Email"/> <input type="button" value="Remove Email"/>

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	BEEL3004C/TL
		Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

**Application Information:**

Title of the Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		
Attorney Docket Number	BEEL3004C/TL	Small Entity Status Claimed	<input type="checkbox"/>
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	6	Suggested Figure for Publication (if any)	

**Filing By Reference:**

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

**Publication Information:**

<input type="checkbox"/> Request Early Publication (Fee required at time of Request 37 CFR 1.219)
<input type="checkbox"/> <b>Request Not to Publish.</b> I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application <b>has not and will not</b> be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

**Representative Information:**

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.			
Please Select One:	<input checked="" type="radio"/> Customer Number	<input type="radio"/> US Patent Practitioner	<input type="radio"/> Limited Recognition (37 CFR 11.9)
Customer Number	23364		

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	BEEL3004C/TL
		Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

## Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending	Remove			
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
	Continuation of	14344836	2015-03-03		
Prior Application Status	Expired	Remove			
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
14344836	a 371 of international	PCT/EP2012/068167	2012-09-14		
Prior Application Status	Expired	Remove			
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
PCT/EP2012/068167	Claims benefit of provisional	61/534592	2011-09-14		
Prior Application Status	Expired	Remove			
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
PCT/EP2012/068167	Claims benefit of provisional	61/635234	2012-04-18		
Prior Application Status	Patented	Remove			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
PCT/EP2012/068167	Continuation in part of	13270659	2011-10-11	8756348	2014-06-17
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the <b>Add</b> button.					Add

## Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)<sup>1</sup> the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	BEEL3004C/TL
		Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

			<input type="button" value="Remove"/>
Application Number	Country <sup>i</sup>	Filing Date (YYYY-MM-DD)	Access Code <sup>j</sup> (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the <b>Add</b> button.			<input type="button" value="Add"/>

## Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

<input type="checkbox"/> This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013. NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.
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<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	BEEL3004C/TL
		Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

## Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

**NOTE:** This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

### 1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

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<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	BEEL3004C/TL
		Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

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<b>Application Data Sheet 37 CFR 1.76</b>		Attorney Docket Number	BEEL3004C/TL
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Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

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## ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

The present invention relates to electronic tools for meetings with audio including methods or devices for providing connection to a communications network, to  
5 networks or methods of operating the network, methods or devices for use in displaying media content with audio as well as software for performing any of these methods.

### Technical background

10

#### Tools for collaboration

Allowing *ad hoc* groups of persons to communicate with each other is one of the fundamental aspects of collaboration, problem solving, negotiation, teaching and education, etc. To assist in communication, there has been an explosion of electronic  
15 communication tools such as electronic conferencing tools, e.g. synchronous and asynchronous conferencing, online chat, Instant Messaging, audio conferencing, videoconferencing, data conferencing, application sharing, remote desktop sharing, electronic meeting systems, collaborative management (coordination) tools, project management systems, knowledge management systems, and social software systems.

20

One classic approach is the lecture or seminar often involving a presentation using presentation software. To a large extent the traditional single person presentation or lecture has been maintained with the audience being in a rather passive mode as far as determining, constructing, augmenting or modifying the information to be presented is  
25 concerned.

30

As with other business processes, meetings are going digital. Increasingly, people are using computer technology alone and in conjunction with broadband networks to support their meeting objectives prior to and during an actual meeting. For example, e-mail is used to pass around files for people to read prior to a meeting.

Collaborative workspaces in corporate networks and on the Internet offer geographically distributed collaborators a virtual repository for documents related to a

project or a meeting. Electronic meeting support systems, such as interactive network-connect whiteboard boards and videoconferencing appliances, are available for the benefit of those who share the same room as well as those who are in remote locations.

- 5 The AMIDA Final Public Report describes the overall methodology behind the development of meeting support technologies. It reports that numerous studies confirm that meetings dominate the way people work. Namely, according to a study conducted by MCI Worldcom in 2003 a business person participates in 60 meetings per month. People meet in groups for a multitude of reasons. They interact in numerous
- 10 predictable and unpredictable ways and the results of their interactions are as varied as the people who participate and the projects on which they are collaborating or communicating. Studies of business processes also reveal that approximately 80% of the “workload” associated with a project or process happens in preparation for a meeting. In other words, many people view the “live” meeting as a milestone or
- 15 deadline by which they can pace and measure their productivity and that of their colleagues. Unfortunately, for many information managers, being in perpetual meetings has reduced their ability to prepare adequately for the next meeting, perpetuating a vicious and negative cycle.
- 20 However, Marc Al-Hames et al. report in “Audio-Visual Processing in Meetings: Seven Questions and Current AMI Answers”, that although large parts of working days are consumed by meetings and conferences, unfortunately a lot of them are neither efficient, nor especially successful. They report a study in which people were asked to select emotion terms that they thought would be frequently experienced in a
- 25 meeting. The top answer – mentioned from more than two third of the participants – was “boring”; furthermore nearly one third mentioned “annoyed” as a frequently perceived emotion.

The conclusion is that despite the plethora of electronic aids to meetings, fundamental

30 problems in handling meetings have not been solved. In fact organising and conducting meetings in a business context involves a large number of factors.

Participation

A lack of efficiency of meetings is addressed in the article “Mood indicators on electronic meeting tools” IBM, IP.com number: IPCOM000011711D, Publication Date: March 12, 2003. This article addresses the issue that the lack of direct feedback makes meetings clumsy, inefficient and often unproductive. It proposes a “mood indicator” as well as an “I want to ask a question” indicator which allow the presenter to choose an appropriate moment to pause, change track or field a question. It is argued that interrupting a presenter in full flow can be awkward; however, sometimes it is difficult to get an opportunity to ask a question or make a comment when many different people are trying to make their voices heard. In a similar vein, US6966035 suggests displaying a “murmur frame” for a participant to express a view. To increase user participation, US 2010/0087139 discloses a system for sending a selection to another computer, and US 2006/0095376 discloses a system for secure voting. Commenting, voting or selecting requires that a central authority provides the information that is to be selected or commented or voted on. Hence, these proposals still leave a central figure such as the presenter in a dominating position and the other members of the meeting are largely an audience with limited selection or voting or participation rights.

A further problem with meetings is that someone is usually late or has to leave early. With the person arriving late one has to decide if the meeting is interrupted and a summary of the proceedings so far is given. For the person leaving early (often a senior person), subsequent discussions can go missing. If there is a notes taker, this provides a personal summary of the meeting – but not an objective one.

Presents systems do not provide an optimal solution.

#### Legal and security issues

A legal requirement of a meeting is that presentations, comments and submissions need to be completely reproducible – in some circumstances, e.g. in a share holders’ meeting, the events in the meeting should be subject to total recall. Computer-supported collaborative work technologies, particularly those which capture human verbal and non-verbal communications (audio and video interaction) in addition to text and graphics generated during a meeting, promise to have a long term impact on how



people will prepare for and behave during and following meetings. In addition, connecting to a network brings the danger of virus, malware or spyware transfer in either direction, and there is danger of copying of confidential information.

## 5 Practical Difficulties

### Scalability and ease of use

There are even more fundamental problems with using electronic tools in meetings. If two persons want to make two presentations then usually either both presentations must be placed on one machine or there is a need to swap between the presenters' machines. To bring the display content of a computer to a projector, the most common ways are to use a cable that connects the display adapter of the graphics card to the video input of the projector [method 1] or to use a software that captures the display contents and sends it over a wired or wireless network to a remote base unit connected to the projector [method 2]. This is often called "remote desktop" and is mostly used for remote administration or remote IT assistance purposes.

Less common but also practiced methods are to use a special device connected to the display adapter of the graphics card, that captures, encodes and streams the display content over a wired or wireless network [method 3].

Method 1 has several practical problems and disadvantages. In meetings where people want to contribute content from their own computers, e.g. to project images on a display, typically a video cable such as a VGA cable is used to connect each PC one at a time to the projector. This is not only not scalable but also can be and often is quite a cumbersome process that typically wastes valuable meeting time and takes the dynamism out of the meeting. Connection can be made more difficult and time consuming for example if the computer has to be rebooted for it to detect the projector or when the format of the PC differs from the format of the projector. In addition changing format can leave the computer with a new format that is not compatible with its own screen so that on reboot of the PC alone, nothing is displayed on the computer screen. Without a visible screen image the necessary re-configuration can be difficult. These issues are aggravated by a number of elements:

- The use of many different video adapters, such as VGA, DVI, DP, HDMI,...
- Reach depends on cable length: too long leaves a tangled cable “salad” in the meeting room, too short reduces flexibility, often necessitating people to move around in the meeting room when they want to present something.
- 5     - Cable connection is either point to point or requires tedious and extensive cabling and the use of complex and expensive video switches.
- It is often difficult and time consuming to find the right display resolution and refresh rate that both the computer and the display or projector support.

10     Method 2 also has many drawbacks. If the connection is made to a corporate LAN there is a danger of virus, malware or spyware transfer in either direction, there is danger of copying of confidential information, and there is the difficulty of making the connection, e.g. entry of a user code and password, as well the administration of such passwords and user codes.

15

The advantage of method 3 is that the computer does not need to use its own processing power to bring the display content in a form that is easily transported over a network. This advantage becomes less relevant as computers grow in processing power. A drawback of method 3 is that the same problems often encountered with  
20     method 1 of connecting to the display adapter remain. Another drawback is that the special device referred to requires significant processing power, which means that this device will consume much power, be relatively big and certainly be relatively expensive.

25     An alternative method in the making today is to use the well known USB interface of the computer for extracting the display content of the computer. US 2009/0198839 discloses such a pluggable cable arrangement. US 2011/0115689 discloses a similar USB solution for wireless connection to a projector. Accordingly connecting a projector to a computer using the standard USB port might become commonplace with  
30     time. However, this usually requires special drivers and even special hardware. Connecting a projector to a computer using the standard USB port hence might become commonplace – but even when that happens there will be a mix of new and legacy machines for several years.

## Firewalls

Additional problems can occur with firewalls. Typically a visitor to a meeting will bring a computer such as a laptop that is set up for a different corporate networking environment and hence has different or incompatible networking settings. The setting  
5 up of a firewall can be complicated and if this is not done correctly, telecommunication software that has to pass through a firewall may be blocked. In order to solve problems associated with firewalls it may be necessary to open ports or identify or even add programs in an exception list. If, besides a network (hardware)  
10 firewall and an operating system firewall, there is any software based third-party firewall like ZoneAlarm, CA Internet Security Suite or McAfee Firewall, then it is necessary to follow that software developer's documentation to place programs on a safe list or adding exceptions to the firewall rules. Such activity is beyond the usual user. Fussing with computer settings, or having to call for IT support wastes valuable  
15 meeting time and takes the dynamism out of the meeting.

## Audio

Software based systems for presentations typically rely on specific software drivers to be installed on the client PC. An example of this is Soundflower on Apple Mac OS/X.  
20 In case the built-in generic audio driver is used, it is hard to guarantee that the audio will work on any given hardware, considering the large variety of sound cards in PC's.

## Conclusion

The following problems remain for holding a face-to-face meeting using advanced  
25 electronic tools at the present time:

- Complexity of the networking infrastructure.
- High demands on technical expertise of users in current systems that are supposed to be designed to support everyday use by the non-expert user.
- Barriers to the use of complicated technology in meetings.
- 30 - Great variety of possible collaborative software solutions – none of which seems to solve the fundamental problems of holding successful meetings.
- Meetings being boring or annoying for members of the meeting.
- Complexity of firewalls and other security measures employed in corporate

networks.

- Lack of, or restriction of participation by members of a meeting.
- Time taken to prepare presentations for meetings.
- Need to record events in the proper time sequence at meetings without
- 5       burdening a meeting more than necessary.
- Lack of standards for audio
- Need to install proprietary drivers for audio
- Large number of different, non-standardised sound cards in use

Although some tools solve some of these problems effectively, no electronic meeting  
10       tool solves all of them.

#### Summary of the invention

An object of the present invention is to provide network solutions including electronic  
tools with audio for meetings as well as devices for providing connection to a  
15       communications network, to methods of operating the network, methods of displaying  
media content with audio as well as software for performing any of these methods or  
for implementing such systems.

In one aspect the present invention relates to a method for capturing audio for use in  
20       presentation systems e.g. at meetings. A wireless network may be used to connect a  
processing device such as a laptop, personal computer, PDA, smartphone etc to a  
display device, e.g. via a projector. The present invention addresses the problems  
caused by the many different audio cards in use for commercial PC's, a lack of a  
standard way for capturing audio that works on all PC platforms (Windows, Mac,  
25       Linux, Android) and the need for synchronization of the captured audio with the  
captured video to provide lip synchronization.

The present invention provides in embodiments a method and a system for connecting  
a processing device, e.g. a digital processing device such as a laptop, smartphone,  
30       PDA, computer, tablet and suchlike to a communications network, the processing  
device having a memory, a display and an operating system with pre-installed generic  
drivers providing a generic communications protocol for communication between  
processing device and a standard class of peripheral devices. The method and/or

system are adapted for:

- a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;
- 5 b) setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
- c) coupling the processing device to a communications network via the peripheral device;
- d) routing audio data between the processing device and the communication network
- 10 via the means for communication, wherein the generic communication protocol is used for transferring the audio data between the processing device and the peripheral device.

In particular the method and/or system can be adapted for:

- 15 a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;
- b) setting up, by means of a first pre-installed generic audio driver of the operating system, a means for audio communication between the peripheral device and the processing device and by means of a second pre-installed generic driver of the
- 20 operating system, a means for data communication between the peripheral device and the processing device;
- c) coupling the processing device to a communications network via the peripheral device;
- d) routing audio data between the processing device and the communication network
- 25 via the means for audio communication, wherein the first pre-installed generic audio driver is used for transferring the audio data between the processing device and the peripheral device.

In an embodiment audio data is captured through a virtual sound card interface added

30 as a logical device over the physical interface provided in the peripheral device. On the processing device only a generic sound driver such as a USB sound driver is required which is generally standard on any modern processing devices such as a PC (UAC1 or UAC2).

In an aspect the present invention provides an electronic meeting tool for communicating arbitrary media content from users at a meeting comprising: a node configuration means adapted to operate a display node of a communications  
5 network, the display node being coupled to a first display, the node configuration means being adapted to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display; and at least one peripheral device adapted to communicate the user selected arbitrary media content via the communications network, wherein the peripheral device is a  
10 connection unit comprising:

- (a) a connector adapted to couple to a port of a processing device having a second display, a memory and an operating system; and
- (b) a transmitter for communicating with the communications network,

15 a program adapted to be loaded onto the processing device and to run on the operating system of the processing device, said program being adapted to obtain user selected arbitrary media content, said program leaving a zero footprint on termination, and an input device to allow the user to carry out a user action that triggers transfer of said  
20 user selected arbitrary media content to said transmitter through said port.

Obtaining user selected arbitrary media content is preferably not obtained by application sharing but by the process of screen scrapping. Although software packages that provide screen scrapping require installation on the target device, or at  
25 least require the installation of dedicated and/or custom drivers, embodiments of the present invention use software stored on the peripheral device which allows screen scrapping when run on the processing device but leaves a zero footprint when terminated. Embodiments of the present invention can screen scrape full HD videos at 20fps without requiring any installation of a program on the processing device nor  
30 requiring configuring the processing device such as a PC that they run on for the connectivity to the network hence meeting "zero footprint" operational requirements.

The program adapted to be loaded onto the processing device and to run on the

operating system of the processing device and being adapted to obtain user selected arbitrary media content can be stored on the peripheral device. The transmitter can be a wireless transmitter or transceiver. The peripheral device can be a plug-and-play device. The program can adapted to screen scrape content of the second display.

5

The input device can be physical actuator coupled to the peripheral device. The physical actuator preferably has a surface area of between 100 and 14,400 square mm. Alternatively, the input device can be a key displayed on the second display. The key displayed on the second display can be one not screen scraped by the program.

10

On the peripheral device a mass storage device is provided that stores the software to be run on the processing device. The mass storage device can be logically closed once the software has been read and loaded and is running from RAM in the processing device. Also provided on the peripheral device is a further device such as an HID

15

(human interface device) to capture user input and provide user feedback. In embodiments of the present invention, the peripheral device contains multiple internal logical devices that are combined:

An HID (human interface device) used for capturing user input (e.g. following a user action such as pressing or activating a button) and providing user feedback, e.g. by an

20

optical indicator such as a light ring around the button e.g. an LED ring, for streaming the screen scraped video content to the network and hence to a base unit and a display,

A mass storage device used to store the application, and optionally

An audio device that acts as a virtual sound card to a client PC over USB, using a

25

generic driver such as a UAC1 or UAC2 device driver.

Embodiments of the present invention are not limited to application sharing but make use of screen scraping which is able to capture all material in a neutral manner rather than being limited by proprietary applications. Further the screen scraper application is zero footprint on termination rather than being fully installed on the processing device. Embodiments of the present invention can provide arbitrary "full content" to the meeting room and participants can display in real-time,

30

The real-time content is shown on a central display rather than being broadcast to

individual participants or archived.

Embodiments of the present invention "auto compose" arbitrary user data on a central display or screen so that full real-time content that is provided by multiple meeting participants who intentionally share this content in order to make the meeting more

5 effective and efficient,

Embodiments of the present invention implement a principle of "democratic screen sharing", in which the meeting participants decide themselves on a peer-to-peer basis which content to share when and where. In particular in some embodiments a participant can obtain unilateral access to the display device, i.e. without agreement of other participants. Peer-to-peer data sharing differs from systems in which the content to be displayed is determined by a presenter or meeting director. The user determines where his content is routed to and can do so without any software configuration on the user processing device.

15 In another aspect the present invention provides a method for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system with at least one pre-installed generic driver providing a generic communications protocol for communication between processing device and a standard class of peripheral devices, the method comprising the steps of:

20 a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;

b) setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;

25 c) coupling the processing device to a communications network via the peripheral device;

d) routing screen scraped data between the processing device and the communication network via the means for communication, wherein the generic communication protocol is used for transferring the screen scraped data between the processing device and the peripheral device.

30

The routing of the screen scraped data can be to a defined network node such as a display node without user entry of configuration details. Thus the routing can be



dedicated to a specific network node such as a display node, base station etc. This is achieved by pairing of the peripheral device to the relevant node before the communication starts.

- 5 In accordance with embodiments of the present invention users start an application from the peripheral device such as a USB dongle, thus making the connection in a 3 step process: (1) connect, e.g. plug in the peripheral device to the processing device, (2) start the screen scraping application, (3) perform a user action such as click on a button on the peripheral device to go allow content to be displayed on the central  
10 screen or display. To achieve step 2 Autorun or AutoPlay can be used with some Windows operating systems, but there are many different variants based on the OS version and which patches have been installed. Furthermore, this mechanism is generally considered a security hazard, which is why most IT departments will disable Autorun/Autoplay. Other OS providers have disabled this function, e.g. Apple  
15 removed a similar functionality entirely from its OS/X since Snow Leopard.

In an embodiment of the present invention a very small service - also called daemon on some OS's - is provided that requires installation on the processing device such as a laptop. This service is pre-installed on the processing device. The installation is  
20 required only once on every processing device such as a laptop. The role of this is to provide a permanently running service which continuously monitors if a peripheral device according to the present invention has been offered up for connection to the processing device. When such a peripheral device is connected, the service will detect this and start the client application software residing in the mass storage area of the  
25 peripheral device. Once the service is installed, connectivity with the peripheral device becomes a 2 step process: connect, e.g. plug in the peripheral device to the processing device, (2) perform a user action such as click on a button on the peripheral device to allow content to be displayed on the central screen or display. The application loaded from the processing device still leaves a zero footprint on termination

30

Step b) can comprise presenting the peripheral device to the processing device as a human interface device (e.g. a USB HID) and wherein the pre-installed generic driver is a human interface device driver (e.g. USB HID driver).

Alternatively or additionally step b) can comprise presenting the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.

5

Alternatively, or additionally step b) comprises presenting the peripheral device to the processing device as a composite device (e.g. USB composite device) and wherein pre-installed generic drivers drive different device interfaces independently.

- 10 A client application can be stored on the peripheral device which when run on the processing device obtains the screen scraped data. Such a client application can be a portable application and can leave a zero footprint on termination.

- 15 In another aspect the present invention provides a peripheral device for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing a generic communication protocol for communication between the processing device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device,
- 20 said executable software code comprising:
- a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
  - a second software code portion for connecting the processing device to a
  - 25 communications network via the peripheral device, the peripheral device having a transceiver;
  - a third software code portion for screen scraping data from the processing device; and
  - a fourth software code for routing screen scraped data between the processing device and the communications network over the means for communication; wherein the first
  - 30 software code portion is adapted to use the generic communication protocol for transferring the screen scraped data between the processing device and the peripheral device.

The first software code portion can be adapted to present the peripheral device to the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver. The first software code portion can be adapted to present the peripheral device to the processing device as a mass storage  
5 device and wherein the pre-installed generic driver is a mass storage device driver. The first software code portion can be adapted to present the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

- 10 The executable software code can comprise fifth code for providing a means for connecting to the communications network including a base node. The third code can comprise means for capturing video frame buffers of the processing device.

The executable software code can comprise sixth code for providing a means for  
15 encoding, compressing and optionally encrypting the screen scraped data and sending the screen scraped data the communication network. The executable software code can comprise seventhcode for providing a means for handling the peripheral device. The executable software code can comprise eighth code for providing means for initiating connection to the base node. The executable software code can comprise ninth code  
20 for receiving inputs from an input device on the peripheral device. The executable software code can comprise tenth code for providing a means for sending state changes to the visual indicator on the peripheral device. The executable software code can comprise eleventh code for providing a means for presenting to the user a GUI. The executable software code can comprise twelfth code for presenting a GUI for  
25 administration of the said executable software code when executed as a portable application. The executable software code can comprise thirteenth code for providing a means for displaying and activating a key on the display of the client processing device for allowing a user to input the start the transfer of data from the processing device to the base node.

30

In another aspect the present invention provides a peripheral device for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing

a generic communication protocol for communication between the processing device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:

- 5 a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
- a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a
- 10 transceiver; and
- a third processing software code for routing data between the processing device and the communications network over the means for communication; wherein the first software code portion is adapted to use the generic communication protocol for transferring the data between the processing device and the peripheral device, and
- 15 an input device coupled to the peripheral device, the input device being adapted to react to a user action to trigger the transfer of the data from the processing device to the peripheral device.

The first software code portion can be adapted to present the peripheral device to the

20 processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver. The first software code portion can be adapted to present the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver. The first software code portion can be adapted to present the peripheral device to the

25 processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

The input device is preferably a physical actuator coupled to the peripheral device. The physical actuator preferably has a surface area of between 100 and 14,400 square

30 mm. The input device can be for example a key for display on the display. The executable software code can comprise fourth code for providing a means for connecting to the communications network including a base node. The executable software code can comprise fifth code for providing a means for capturing video frame

5 buffers of the processing device. The executable software code can comprise sixth code for providing a means for encoding, compressing and optionally encrypting the video frames and sending them over a secure link to the base node. The executable software code can comprise seventh code for providing a means for handling the peripheral device. The executable software code can comprise eighth code for providing a means for initiating connection to the base node. The executable software code can comprises ninth code for receive inputs from an input device on the peripheral device. The executable software code can comprise tenth code for providing a means for sending state changes to the visual indicator on the peripheral device. The executable software code can comprise eleventh code for providing a means for presenting the user a GUI. The executable software code can comprise twelfth code for presenting GUI for administration of the executable software code when executed as a portable application. The executable software code can comprise thirteenth code for providing a means for displaying and activating a key on the display of the processing device for allowing a user input to start the transfer of data from the processing device to the base node.

In another aspect of the invention a peripheral device is provided for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing a generic communication protocol for communication between the processing device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:

25 a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;

a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a transceiver;

30 a third software code portion for receiving media content from the network and for displaying the media content on the display in accordance with a set of rules; wherein the first software code portion is adapted to use the generic communication protocol

for transferring the media content between the peripheral device and the processing device.

The executable software code can comprise fourth code for providing a means for  
5 correctly configuring a receiver as an access point. The executable software code can  
comprise fifth code for providing a means for listening for output of connection units  
trying to connect on a specific port. The executable software code can comprise sixth  
code for providing a means for a GUI for administration purposes. The executable  
software code can comprise seventh code for providing a means for publishing its  
10 presence over the network using the zeroconf protocol. The executable software code  
can comprise eighth code for providing a means for accepting and installing software  
updates. The executable software code can comprise ninth code for providing a means  
for providing facilities for pairing of connection units to the processing device. The  
executable software code can comprise tenth code for providing a means for auto-  
15 composing of different incoming arbitrary media streams and rendering of composited  
image on display. The executable software code can comprise eleventh code for  
providing a means for receiving, decrypting and decoding incoming arbitrary media  
content. The executable software code can comprise twelfth code for scaling of  
incoming arbitrary media streams. The executable software code can comprise  
20 thirteenth code for providing a means for displaying incoming arbitrary media content  
in accordance with a set of rules.

The present invention also provides a method for communicating arbitrary media  
content from users at a meeting comprising:

25 operating a display node of a communications network, the display node being  
coupled to a first display, to receive user selected arbitrary media content and to  
control display of the user selected arbitrary media content on the first display; and  
connecting a peripheral device to a port of a processing device and communicating the  
user selected arbitrary media content via the communications network,  
30 loading a program onto the processing device and running the program on the  
operating system of the processing device to obtain user selected arbitrary media  
content, said program leaving a zero footprint on termination, and  
triggering transfer of said user selected arbitrary media content to said transmitter

through said port after a user action on an input device.

The present invention also provides a peripheral device comprising:

a base

- 5 a connector for connection to a plug and play port of a host processing device,  
a flexible connection between the base and the connector for transferring data signals  
and power,  
an actuator on the base for actuating a signal and for transferring the signal to the  
connector for transfer to the port, wherein the base has electronics comprising  
10 permanent storage for storing a portable application, a processing engine, a transceiver  
and a visual indicator.

The present invention also provides a method for providing communication  
connectivity from a processing device,

- 15 setting up a communications network between a base node of the communications  
network and a peripheral device coupled to the processing device;  
transferring media content between the processing device and the peripheral device,  
transmitting the media content from the peripheral device to the communications  
network,  
20 receiving media content from the communications network at the base node and  
displaying the media content on a display in accordance with a set of rules.

Any of the above software code stored on a non-transitory storage medium.

25 Definitions

- "Plug and play" is a term used to describe the characteristic of a computer bus, or  
device specification, which facilitates the discovery of a hardware component in a  
system, without the need for physical device configuration, or user intervention in  
30 resolving resource conflicts. Plug and play devices can be added to a bus of a  
computing system (while running or when shut down), and the newly added device  
and possibly the rest of the computing system is automatically configured to make the  
newly added device work, both from hardware and from software perspective.



Plug and play interfaces include for example (not an exhaustive list): Firewire (IEEE-1394), PCI, Mini PCI, PCI Express, Mini PCI Express, PCMCIA, PC Card, Universal Serial Bus (USB), SDIO cards.

5

"Auto-configuration" is the automatic configuration of devices without manual intervention, without setting any switches or jumpers, and without any need for software configuration. An example of auto-configuring devices: USB devices. Examples of auto-configuring protocols: DHCP, Zeroconf, Bonjour.

10

A plug and play device has auto-configuration software by default to make it plug and play. Example: USB devices are made to be plug and play by including the correct auto-configuration software (e.g. host driver, host stack, application software).

Autoconfiguration can also refer to a software alone and is not restricted to a physical device.

15

"Hot swapping and hot plugging" are terms used to describe the functions of replacing computer system components without shutting down the system. More specifically, hot swapping describes replacing components without significant interruption to the system, while hot plugging describes the addition of components that would expand the system without significant interruption to the operation of the system. A well-known example of this functionality is the Universal Serial Bus (USB) that allows users to add or remove peripheral components such as a mouse, keyboard, or printer. Other examples are eSATA, PCIe, FireWire, for example.

20

25

A "portable application" (portable app), sometimes also called standalone, is a computer software program designed to run without installation on the target machine. This type of application is stored on a removable storage device such as a CD, USB flash drive, flash card, or floppy disk – storing its program files, configuration information and data on the storage medium alone. It is a program that can be stored on an electronic device such as a USB flash drive, iPod, memory card, portable hard drive or other portable electronic device and runs on a computer or other processing device coupled to the electronic device without making permanent configuration

30



changes to the host computer. All such programs have a zero-footprint, meaning all temporary files, registry entries, and any other changes to the machine exist only while the program is running.

- 5 To be considered a portable application, for purpose of this invention, a software program must:

Not require any kind of formal installation onto a computer's permanent storage device to be executed, and can be stored on a removable storage device such as USB flash drive, iPod, memory card, portable hard drive or other portable electronic storage

- 10 device thus enabling it to be used on multiple computers.

Settings are stored with, and can be preferably carried around with, the software (i.e., they are written to the electronic device such as a USB drive). Settings are not stored to the registry or any other central system database of the computer.

- 15 Leaves a zero (or near-zero) "footprint" on any PC it is run on after being used. i.e., all temporary files/registry settings should be either avoided or at least removed once the program has exited, and files created by the user can be saved directly to the same removable media as the application is stored on.

- 20 A portable application does not leave its files or settings on the host computer on which it runs. For example, the application does not write to the Windows registry or store its configuration files (such as an INI file) in the user's profile; instead, it stores its configuration files in the program's directory. Another requirement, since file paths will often differ on changing computers due to variation in Windows drive letter  
25 assignments, is the need for applications to store them in a relative format. Preferably, such a program does not require a launcher program to copy necessary settings and files to the host computer when the application starts and move them back to the application's directory when it closes as this may leave a residue on the hard drive in case of power failure.

30

"Electronic meeting systems" (EMS) need to be distinguished on the one hand from classic groupware, on the other from web conferencing systems. In reality, there is some overlap between minor features of products of the named categories. The main

difference from groupware is the intensity of collaboration. EMS should be distinguished from systems with which it is possible to show the contents of an individual computer screen on a remote display with multiple users at the same time.

- 5 "Groupware" supports collaboration within groups where the individual contributions remain identifiable. In contrast, EMS enable the group to cooperatively produce a result for which the group is responsible as a whole. In a business process, groupware and electronic meeting systems complement each other: Groupware supports teams when researching and creating documents in the run up to an EMS session or when  
10 implementing the results of such a session.

"Web conferencing systems" and "electronic meeting systems" complement each other in the online meeting or workshop: EMS extends the web conferencing system by providing interactive tools for producing and documenting group results. On the other  
15 hand, "web conferencing systems" complement EMS with the screen sharing and voice conferencing functionality required in synchronous online meetings and not present in EMS.

"Data conferencing" refers to a communication session among two or more  
20 participants sharing computer data in real time. Interaction and presentation devices such as a screen, keyboard, mouse, camera, etc. can be shared. It is a term used to distinguish from video conferencing and audio conferencing. The data can include screen, documents, graphics, drawings and applications that can be seen by the participants of the meeting.

25 "Application sharing" is an element of remote access, falling under the collaborative software umbrella, that enables two or more users to access a shared application or document from their respective computers simultaneously in real time. Generally, the shared application or document will be running on a host computer, and remote access  
30 to the shared content will be provided to other users by the host user. Application sharing should be distinguished from systems in which collaboration on the applications between different users is not possible but the contents of individual computer screens can be projected onto a remote display with multiple users at the

same time.

The term “arbitrary media content” refers to the fact that a user may generate, create or select any media content that is appropriate to display. This differs from client voting  
5 on, or selecting of media content that is displayed by another in a meeting or presentation. This term refers to client oriented, distributed rights and privileges for the display of content rather than a central presenter providing content which is presented to the members of the meeting.

10 “Screen scraping” in our sense refers to reading the video frame buffers and processing them, rather than just rendering them on a display. Screen scraping for presentations is described in US2002/0196378 to Slobodin et al which is included herein by reference.

15 “Auto composition” or “auto layout” refers to the automatic nature in which multiple graphics/video sources are rendered on a central display, without user intervention and in a way that a user would intuitively expect it to happen.

20 “Wireless” and “wireless communication network” can be any network that does not use cable links between nodes, e.g. uses RF, optical or InfraRed for communication purposes, such as IrDA, diffuse infra-red, WLAN, WiMax, WiFi, WiFi Direct, Bluetooth or any other wireless communication network known to the person skilled in the art such as optical networks like LiFi.

25 “Computer” generally refers to a processing device, i.e. having a processing engine capable of various types of digital processing, such as rendering graphics images for display. A computer can be in the form of a work station, a personal computer, a laptop, a palm top, a PDA, a smartphone, a tablet etc. Generally a computer has memory such as volatile RAM. Non-volatile memory such as a hard disc, optical disk or solid  
30 state memory can be included in the computer or can be a peripheral device. Currently most computers are electronic but the term “computer” also include optics based computing devices.

The term "pre-installed generic driver" is intended to mean a driver which is installed on a processing device such as a computer as a standard driver, e.g. is installed with the installation of the operating system. Such a driver is standard for the operating system and can drive a standard class of peripheral devices coupled to or connected to the processing device. The installation of a specific driver for such a peripheral device is not required. Such a generic driver can be a human interface driver (HID) or a mass storage device driver, which has predetermined software components configured for driving mass storage, a CD-ROM, a keyboard etc. or combinations of these. Such devices can be readable and writable computer peripheral memory devices such as USB memory sticks, flash memories, external hard drives, or more.

#### Brief Descriptions of the drawings

Fig. 1a shows a meeting room that can be used with embodiments of the present invention. Fig. 1b shows a combination of a client processing device, a connection unit, a base node and a display in accordance with an embodiment of the present invention.

Fig 2 shows a screen display in accordance with an embodiment of the present invention.

Figs. 3 to 5 show a base node and a peripheral device and a client processing device in accordance with embodiments of the present invention.

Fig 6 shows a display in accordance with an embodiment of the present invention.

Fig. 7 shows a peripheral device in accordance with an embodiment of the present invention.

Fig. 8 shows a client processing device in accordance with an embodiment of the present invention.

Fig. 9 shows a further client processing device in accordance with an embodiment of the present invention.

Fig. 10 shows an embodiment of a peripheral device in accordance with an embodiment of the present invention.

Fig. 11 is a schematic representation of a communications system for presentations in which audio has been integrated in accordance with an embodiment of the present invention.

### Detailed Description of the Embodiments of the present Invention

The present invention will be described with respect to particular embodiments and with reference to certain drawings but the invention is not limited thereto but only by  
5 the claims. The drawings described are only schematic and are non-limiting.

Furthermore, the terms first, second, third and the like in the description and in the claims, are used for distinguishing between similar elements and not necessarily for describing a sequential or chronological order. The terms are interchangeable under  
10 appropriate circumstances and the embodiments of the invention can operate in other sequences than described or illustrated herein.

Moreover, the terms top, bottom, over, under and the like in the description and the claims are used for descriptive purposes and not necessarily for describing relative  
15 positions. The terms so used are interchangeable under appropriate circumstances and the embodiments of the invention described herein can operate in other orientations than described or illustrated herein.

The term "comprising", used in the claims, should not be interpreted as being  
20 restricted to the means listed thereafter; it does not exclude other elements or steps. It needs to be interpreted as specifying the presence of the stated features, integers, steps or components as referred to, but does not preclude the presence or addition of one or more other features, integers, steps or components, or groups thereof. Thus, the scope of the expression "a device comprising means A and B" should not be limited to  
25 devices consisting only of components A and B. It means that with respect to the present invention, the only relevant components of the device are A and B.

Similarly, it is to be noticed that the term "coupled", also used in the description or claims, should not be interpreted as being restricted to direct connections only. Thus,  
30 the scope of the expression "a device A coupled to a device B" should not be limited to devices or systems wherein an output of device A is directly connected to an input of device B. It means that there exists a path between an output of A and an input of B which may be a path including other devices or means.

Elements or parts of the described devices may comprise logic encoded in media for performing any kind of information processing. Logic may comprise software encoded in a disk or other computer-readable medium and/or instructions encoded in an  
5 application specific integrated circuit (ASIC), field programmable gate array (FPGA), or other processor or hardware.

References to software can encompass any type of programs in any language executable directly or indirectly by a processor.

10

References to logic, hardware, processor or circuitry can encompass any kind of logic or analog circuitry, integrated to any degree, and not limited to general purpose processors, digital signal processors, ASICs, FPGAs, discrete components or transistor logic gates and so on.

15

Embodiments of the present invention provide solutions to three major problems with meetings:

- 20 a) the time taken to prepare for a meeting. This is mainly achieved by allowing “on-the-fly” presentation of any displayable information. This information does not have to be linked into any particular presentation software, nor to be compatible with any such presentation software,
- b) the time taken to conduct the meeting using electronic meeting tools. This is achieved by reducing the time to connect computers to the display or projection  
25 system.
- c) the time taken to reflect and review and document the meeting afterwards. This is achieved by providing the possibility of recording the course of the meeting in the same time sequence that it was carried out as well as be able to store all data presented and who presented it.

30

Fig. 1a is a schematic representation of a generic meeting room 30 with a meeting table that can be used with embodiments of the present invention. Participants 37 having some form of processing device 31 such as a laptop computer, a tablet, a PDA

etc. Each of the processing devices 31 can be a host device and has a first connection unit 47 to which it is coupled. The first connection unit 47 provides access to a network 50 which in this case is a wireless network, but could be a wired network. Each connection unit 47 may be coupled to an input device 48 which will be described in more detail later. A user 37 will typically at a distance from the processing device 37 which is ergonomically satisfactory. This ergonomic boundary is typically an area of about 1000 sq cm to 4000 sq cm. This ergonomic boundary will typically have the user as one side of the boundary and the comfortable reach of the arms will determine an area on the left and right of the processing device which falls within the ergonomic boundary and the far edge of the boundary of the processing device (normally delimited by a display screen) will determine the other side of the ergonomic boundary. The area defined by the ergonomic boundary will overlap or include the processing device 31 itself. The processing device will also have an outer physical boundary. The input device 48 is preferably arranged to operate outside the boundary of the processing device 31 but within the ergonomic boundary. Preferably the input device is arranged to function when it is flat on the table. The input device preferably has a size of activation area of between 1 and 144 square cm.

Preferably the network 50 is a local area network, i.e. preferably local to the meeting room for security reasons but the network 50 may have access to other local or wide area networks such as 51 or to a larger corporate network or the internet 43, for example via a router 42. Another node of the network 50 is the base or display node 36. This node 36 may optionally be a wireless access point. The base node 36 may also be a processing device or host computer and may be coupled to a second connection unit 49 that provides access to the network 50 thus linking all of the processing devices 31, 36 together. The connection unit may have an input device as described above. Alternatively, network connections installed on the base node 36 can be used. Audio equipment 46 may be provided, e.g. a telephone that allows other members of the meeting to call in from remote destinations.

The display node 36 is coupled to and adapted to allow display of media on some kind of display 44. The display node is in embodiments of the present invention a base node of the communications network 50. The display 44 may be a projector and/or screen,

the projector being coupled to the base node 36. A whiteboard 45 can optionally be provided that can be optionally coupled to the display 44 and/or the base node 36, e.g. when the whiteboard can record electronically what is written on it. Optionally, a camera 35 may be provided to record the entries on the whiteboard 45. The camera 35  
5 may have a third connection unit 52 for connecting the camera 35 to the network 50 so that the data from the whiteboard can be recorded and stored or transmitted to other networks via router 42. The connection unit 52 may have an input device 53 as described above for the connection unit 47.

10 Optional equipment can be cameras 39, 40, 41 for recording the progress of the meeting. These cameras can be linked by a network 51, e.g. a cable network to the router 42 and/or the base node 36. Another optional item is a microphone or microphones 38 that can be used to transfer audio, e.g. to the processing devices 31 and to loud speakers (not shown) attached to the base node 36 or part of the display  
15 44.

Any or all of the outputs of the processing devices 31, the cameras, the whiteboard, etc. can be recorded and stored digitally, e.g. in node 36 or elsewhere to provide a complete record with correct time sequence.

20 Summarising the above, the present invention provides an electronic meeting tool for communicating arbitrary media content between different users 37 (with their own processing devices 31, e.g. PC, mobile phone, or tablet) and one display or projector or multiple displays or projectors 44 in the meeting room 30.

25 Referring to Figs. 1a and 1b embodiments of the present invention comprise a base or display node 36 being a processing device, e.g. a host computer adapted to receive user selected arbitrary media content, the base node 36 being coupled to a central display 44 which can be a fixed format display and/or a projector or similar. The  
30 arbitrary media content can be provided from any of the user processing devices 31. The base node 36 can be adapted to display the received user selected arbitrary media content in accordance with a set of rules, e.g. FIFO, automatically, on request or approval, forced to display, in accordance with a priority etc. Optionally the base node



36 is adapted to force display of the received user selected arbitrary media content, i.e. to allow participation in the meeting by an individual user displaying own selected content on display 44 independently of the person who is nominally responsible for giving a presentation or chairing the meeting. Forcing the display can also be  
5 considered as a rule. The meeting tool can also be adapted to allow a priority setting. This means that a user can set a priority setting for the media to be displayed. A priority of "1" for example can be interpreted by the base node as a forced display, a priority "2" can be interpreted by the base node as display as soon as possible, priority "3" can be interpreted by the base node as place in queue and display as the time  
10 comes etc. Setting and using priorities for display are also considered to be working to rules. To execute the rules, the base node 36 may have a decision module. The base node 36 may be a host computer having a processing engine such as a microprocessor and a memory. Preferably, the base node 36 is adapted to treat media content passed to the base node 36 from any or all of the connection units 47 in an equal manner. The  
15 base node 36 may be adapted to auto compose the media content on the central display 44 connected to it, e.g. from one or more processing devices 31.

An independent aspect of the present invention is at least one connection unit 47, (optionally 49 for receiving or optionally connection unit 52) adapted to communicate  
20 the user selected arbitrary media content to said base node 36. Preferably the connection units 47 and/or optionally 49 or optionally connection unit 52 are physical plug-and-play devices. An example of a connection unit is shown schematically in Fig. 10.

25 The connection unit 47 be may integrated into a user processing device 31, e.g. as an internal peripheral device or may preferably be an external peripheral device comprising a connector adapted to couple to a port of a user processing device 31. The processing device 31 may have a client display, a processing engine such as a microprocessor, a memory and an operating system. The optional connection unit 49  
30 may be integrated into the base node 36, e.g. as an internal peripheral device or may be an external peripheral device comprising a connector adapted to couple to a port of the base node 36. The connection unit 49 may be fully integrated into the base node 36, e.g. is an internal network interface of the base node 36. The base node 36 may have a

processing engine such as a microprocessor, a memory and an operating system.

The user processing devices 31, the connection units 47, (optionally 49 or optionally connection unit 52) and the base node 36 co-operate to form a communication network  
5 50 for linking between at least one of the plurality of processing devices 31, 36 and 35 and the central display device 44. The communication network 50 is adapted to receive arbitrary media content from at least one of the plurality of processing devices 31 and to transmit the arbitrary media content of at least one of the plurality of processing devices to the central display device 44.

10

An independent aspect of the present invention is a portable application 60 adapted to be loaded onto a client processing device 31 and to be run on the operating system of the client processing device 31. The portable application 60 runs as a process on the client processing device 31 that is adapted to deliver an arbitrary media content from  
15 the client processing device 31 to the communication network 50 in response to a user action applied to an input device 48, the process leaving a zero footprint on termination on the client processing device 31. Optionally the portable application 60 is stored on each connection unit 47 and optionally 49. Preferably the portable application 60 is adapted to “screen scrape” content of the client display of the client  
20 processing device 31. Optionally the portable application 60 when run on a processing device 31 is adapted to “screen scrape” content of the client display of this client processing device 31 and to transmit it via a connection unit 47. Optionally the portable application 60 when run on the processing device is adapted to “screen scrape” content of the client display of the client processing device 31 and to transmit  
25 it via a network interface of the processing device 31, for example if the connection unit 47 has no transmitter or this is not functioning.

30

The connection unit 47 for communicating with said base node 36 has a network interface e.g. comprising a transmitter 62. The transmitter 62 is preferably a transceiver. Optionally the transmitter/receiver can be a wireless transmitter/receiver.

The base node 36 for communicating with the connection unit 47 has a receiver 63 which can be included in the connection unit 49 or integrated into the base node 36.

The receiver is preferably a transceiver. Optionally the transmitter/receiver can be a wireless transmitter/receiver.

5 The input device 48 allows a user interaction with the connection unit 47. Preferably the input device 48 is physical actuator coupled to the connection unit 47. The user action applied to the input device 48 generates a signal that can trigger transfer of data from the processing device 31 (to which the connection unit 47 is coupled) to the network 50. Preferably the input device 48 has an activating surface that is between 100 and 14,400 square mm. Optionally, the input device 48 can be a key displayed on  
10 the client display 1 of a client processing device 31. This key can be activated, e.g. by use of a pointing device such as a mouse trigger transfer of data from the processing device 31 to the network 50.

15 The connection unit 47 is preferably provided with a visual indicator 61, e.g. for allowing user feedback from the connection unit 47 of the status of any activity.

The system also can include a server program 64 adapted to be loaded onto the base node 36, said program 64 being adapted to receive arbitrary media content from one or a plurality of client processing devices 31 through said connection units 47, (optionally  
20 49 or 52), and to show this plurality of arbitrary media content streams on one or a plurality of displays 44. The server program 64 may be adapted to allow display in accordance with one or more rules, e.g. FIFO, automatically, on request, forced, in accordance with a priority etc. To execute the rules, the server program 64 may have a decision module.

25

Preferably, the server program 64 is adapted to treat media content passed to it from any or all of the connection units 47 or 52 in an equal manner. The server program 64 may be adapted to auto compose the media content on the central display 44.

30 The server program 64 may be a portable application adapted to be loaded onto the base node 36 and to be run on the operating system of the base node 36. The portable application 64 runs a process on the base node 36 that is adapted to display an arbitrary media content received from the client processing device 31 via the

communication network 50, the process leaving a zero footprint on the base node 36 on termination. Optionally the portable application 64 is stored on each connection unit 49 and optionally 47 and can be installed therefrom.

- 5 The system may also include a central display device 44 and optionally a whiteboard 45 or other display means such as a printer. The display 44 being adapted to receive user selected arbitrary media content, and may be adapted to allow display of the received user selected arbitrary media content in accordance with one or more rules, e.g. FIFO, automatic, forced, on request or approval, in accordance with a priority etc.

10

Optionally, one of the connection units 47 can be adapted to be a master connection unit. Such a master connection unit may be adapted to instruct the base node when media content from a client processing device 31 may be displayed or which of the processing devices may be allowed to send content for display.

15

In embodiments of the present invention, at least one portable application is used, e.g. for the client software on a client processing device 31 or optionally on the base node 36. In these embodiments, one of the pre-installed generic drivers of the operating system on the relevant computer device 31, 36 is exploited for setting up

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communication from the computer device 31, 36 to the network 50 via the connection unit 47, (optionally 49). The generic driver is used in connection with the connection unit 47, (optionally 49) operating as a peripheral device but the use can go beyond that of the standard class of peripheral devices for which the generic driver is intended. In some embodiments the connection unit 47, (optionally 49) operated as a peripheral

25 device communicates with the relevant processing device 31, 36 by using a generic communication protocol provided by the pre-installed generic driver. Pre-installed USB drivers are examples. Preferably the setting up of the communication of network 50 using connection unit 47, (optionally 49) does not alter or affect the networking capability of the relevant processing device 31, 36. For example, if a browser is started

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on the client processing device 31, this browser can use the standard network interfaces on the processing device 31. This means that transfer of data via the connection unit 47 (optionally 49) is independent of transfer of data over the network interfaces of processing device 31 or 36. This has the advantage that each user can

carry out processing such as searching on the internet to gather data independently of the transfer of data to be displayed during a meeting, or receive emails etc.

5 The use of a portable application has the advantage that any modification to settings in the register or generally in the operating system can be avoided, so that upon any form of termination, e.g. disconnecting the electronic device, system crash, no trace is left. This is generally termed "zero footprint".

10 The present invention has the advantage of scalability. It can provide a display system for use by a plurality of users in meetings. Every user in the meeting thus can have a client processing device 31 for coupling to a connection unit 47. A first user action connects the client processing device 31 to the base node 36, e.g. by inserting a connection unit 47 into the relevant interface connector on the processing device 31, e.g. a USB interface. A second user action comprising activating a button or key on  
15 the input device (e.g. by depressing it) then starts the process of transmitting arbitrary media content from the client processing device 31 to the base node 36. This process preferably includes screen scraping data from the processing device. Using screen scraping avoids special programs being installed on the base node 36 to carry out graphical commands sent from the processing device 31. When the base node 36  
20 receives the plurality of arbitrary media content, it can allow auto composition of this media content on the central display connected to it.

The present invention will now be described further with reference to certain more specific embodiments.

25

With reference to Fig. 2, the base node software (6) running on a base node 36 can be adapted to display on the central display a splash screen (21) showing its readiness to receive arbitrary media content over its receiver. This splash screen (21) can also show instructions on how to use the system, as well as the configuration parameters (see  
30 later) to reach the base node 36. These configuration parameters are also shown in a transparent canvas at the bottom of the central display (22).

A client processing device 31 that wants to have its arbitrary media content displayed

on the central display connected to the base node 36 is connected to a connection unit 47. The portable application 60 will be executed on the client processing device 31 as a host device. A first user interaction creates a connection between the portable application 60 and the base node 36 using the transmitter in the connection unit 47 and the receiver in the base node 36. The first user interaction can be the connection of the unit 47 to the client processing device 31. A second user interaction, this time on the input device 48, activates screen scraping by the portable application of the arbitrary media content from the client processing device display, which is then sent over the connector unit 47 to the base node.

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The base node 36 receives the plurality of arbitrary media content coming from one or more connection units 47, and auto composes this media content for rendering on the central display.

15 The visual indicator 61 on the connection unit 47 indicates to the user and to other participants in the meeting that media content is being sent by that connection unit 47 to the base node 36 for display.

Repeating the second user interaction on the input device 48 of a connection unit 47 decouples the media content from that connection unit 47 from the base node 36. The base node 36 removes that media content from the composed image on the central display and recomposes the remaining content on the central display.

The content on the central display/projector is auto arranged as shown in figure 2. When user 1 adds content, his/her display will be scaled to fill the available central display canvas as much as possible, but without affecting the aspect ratio. When user 2 adds in, his content is added to the side of the first image. When user 3 adds his content, the arrangement is, for example, triangle wise. Adding user 4, the image becomes a 2 by 2 tiling, which is the maximum available. When an additional user attempts to add content, he will be blocked. When a user initiates action to remove his/her content, his/her media content is removed from the central display and one moves backward in the composition sequence shown in figure 2.

#### Base node software

The base node software has one or more of the following features:

- First code for providing a means or a method step for correctly configuring the receiver of the base node.
- 5     - Second code for providing a means or a method step for listening for output of connection units trying to connect on a specific port.
- Optionally, third code for providing a means or a method step for a GUI for administration purposes, offered for example over a web interface.
- Optionally, fourth code for providing a means or a method step for publishing  
10     its presence over the network using the zeroconf protocol.
- Optionally, fifth code for providing a means or a method step for accepting and installing software updates of the base node as well as for the portable application software for the connection units.
- Sixth code for providing a means or a method step for providing facilities for  
15     pairing of connection units to the base node.
- Seventh code for providing a means or a method step for auto-composing of different incoming arbitrary media streams and rendering of composited image on display or projector screen.
- Eighth code for providing a means or a method step for receiving, decrypting  
20     and decoding incoming arbitrary media content.
- Optionally ninth code for providing a means or a method step for scaling of incoming arbitrary media streams
- Optionally tenth code for providing a means for displaying incoming arbitrary media content in accordance with a set of one or more rules.

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Any of the above code may be stored on a non-transitory machine readable storage medium such as an optical disk, a magnetic disk, magnetic tape, solid state memory, USB mass storage device etc.

#### 30     Portable application for the client processing device

The portable application comprises an algorithm for screen scraping. Screen scraping algorithms include VNC and RDP or similar. The algorithm may include a



combination of algorithms such as VNC and RDP that are optimized for different content, e.g. static text or video. The portable application has one or more of the following features:

- 5       - Eleventh code for providing a means or a method step for connecting to a network including the base node.
- Twelfth code for providing a means or a method step for capturing video frame buffers of the client processing device, i.e. computer (C), also called screen scraping.
- 10     - Thirteenth code for providing a means or a method step for encoding, compressing and optionally encrypting these video frames and sending them over a secure link to the base node. Only changed areas such as rectangles or triangles of the screen (or other suitable geometrical shapes) need to be transferred, and different types of rectangles or triangles are encoded in different ways (e.g. RLE, JPEG,...) to optimise performance.
- 15     - Fourteenth code for providing a means or a method step for handling the connection unit.
- Fifteenth code for providing a means or a method step for initiating connection to base node.
- Sixteenth code for receive inputs from the input device on the connection unit.
- 20     - Seventeenth code for providing a means or a method step for sending state changes to the visual indicator on the connection unit.
- Optionally, eighteenth code for providing a means or a method step for presenting the user a GUI (18).
- Optionally, nineteenth code for presenting GUI for administration of the portable application.
- 25     - Optionally, twentieth code for providing a means or a method step for displaying and activating a key on the display of the client processing device for allowing a user input to start the transfer of data from the client device to the base node.

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Any of the above code may be stored on a non-transitory machine readable storage medium such as an optical disk, a magnetic disk, magnetic tape, solid state memory, nand Flash etc.



In this embodiment the portable application stored on the connection unit, and is executed in an execution context on the client processing device. The portable application does not need to be copied to or installed on the computer. It can be  
5 executed directly from the connection unit. It will only be copied temporarily into an execution context on the client processing device. There are also no changes in configuration required or settings in the client processing device. This means that nothing will remain on the client processing device when the connection unit is removed. It also implies that the portable application will run on client processing  
10 devices where the user does not have the necessary access rights to install software.

The portable application is designed in such a way that

- No specific drivers need to be installed on the client processing device.
- Pre-installed drivers are used, e.g. for classes of peripheral devices.
- 15 - It is independent from vendor specific graphics hardware.
- It runs on at least one and preferably on a variety of different client processing devices, including Windows, Mac OS/X, Linux, Android, iOS and many others.

## 20 Advantages

The present application has one or more of the following advantages:

- No need for a master role in the meeting
- Standard plug and play connectivity of connection units to base node
- 25 - Simple and well known user actions are employed
- Own networking facilities of client processing devices not blocked
- No configuration changes on the client processing device
- Input devices are easily accessible; e.g. large size
- Program updates of portable application and server program can be performed  
30 locally
- Portable applications are used, no installation, multi-platform, no vendor specifics
- Particular implementation of screen scraping done by portable application

avoids vendor specific graphics devices

- Standard drivers are used so no drivers have to be installed
- No configuration changes on the client processing devices
- Zero footprint applications on client processing devices – nothing to clear up or  
5 adjust or reset
- Own networking facilities of client processing devices not blocked
- No configuration changes on the user computers
- Low virus, malware and spyware risk

10 The portable application may be stored on a non-transitory machine readable storage medium such as an optical disk, a magnetic disk, magnetic tape, solid state memory, nand Flash etc.

#### Second Embodiment

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In the second embodiment, referring to Figs. 2 to 5, the base node is a separate physical processing device called base unit (B), comprising permanent storage, memory, a processing engine, a wireless access point (4), a plug and play interface such as a USB port (11), a graphics display output adapter (5) like

20 VGA/DP/DVI/HDMI, and optionally an audio output adapter (27). An input device having an actuator such as a button 13 and a visual indicator 14 are optional.

The connection unit is a physical device in the form of an external peripheral device (shown in the drawings as a “dongle” D) comprising permanent storage storing the  
25 portable application (7) and configuration parameters (12), memory, a processing engine (e.g. CPU, FPGA), a wireless transmitter such as WiFi (3) or other wireless transmitters such as LiFi, a plug and play interface such as a USB interface (2), a button as input device (9), an LED ring as visual indicator (10). The portable application is stored on the peripheral device (7).

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The client processing device is host device, for example a computer or laptop comprising a display, a plug and play interface such as a USB port (2), memory, and a processing engine such as a microporcessor.

The system thus comprises

- an external peripheral device (D) that has a plug and play interface such as a USB interface (2) on one end and a communications interface such as a wireless interface configured as client (3) on the other end.
- a base unit (B) that has a communications interface such as a wireless interface configured as access point on one end (4) and a video card adapter (5) like VGA, DVI, DP or HDMI on the other end.
- a portable application (7) stored on the peripheral device (D) but executed on the client processing device (C)
- a base node software (6) stored and executed on the base unit (B)

The external peripheral device (D) also preferably has any one or any combination of:

- a large button as actuator for the input device (9) allowing user interaction with the peripheral device. The button preferably has an actuation surface area of between 100 and 14,400 square mm.
- visual indication such as a LED (10) allowing user feedback from the peripheral device. The user feedback can be in the form of a light ring.

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An advantage of embodiments of the present invention is to provide data transfer to the peripheral device via a peripheral interface such as a USB interface on any processing device such as a computer in a manner that is largely operating system independent and without leaving a footprint (Zero-Footprint). Installation of drivers and/or applications onto such a processing device as a computer is not necessary wherever pre-installed generic drivers are present. Administrator rights on the processing device such as a computer are preferably not necessary. To avoid the need for administrator rights, embodiments of the present invention use other peripheral device pre-installed drivers such as USB class drivers supported without any extra installation. Embodiments of the present invention route at least screen scraped data presented by client software running on the processing device for transfer to a communications network via a peripheral device such as a USB device. This bypasses any network interface of the processing device C (and hence many firewalls) but only

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for the specific client software. Other applications are not affected and can make use of the standard network interfaces, i.e. packets from/to the TCP/IP stack are transferred to a network device as normal. The client software is launched from the peripheral device such as a USB composite device or storage device as a portable application, which can avoid that any traces are left on the host OS.

#### Basic usage scenario of the second embodiment

The base node software (6) displays on the projector a splash screen – (21) in figure 5 - showing its readiness to receive arbitrary media content over its receiver (4). This splash screen (21) also shows instructions on how to use the system, as well as the configuration parameters (see later) to reach the base node. These configuration parameters can also be shown in a transparent canvas at the bottom of the central display (22).

To avoid user interaction for the configuration of the connection between peripheral device and base unit, a pairing process is used. This pairing process provides the peripheral device, i.e. the connection unit with networks parameters needed to set up the local network. As an example, the peripheral device can be briefly plugged into the USB port (11) of the base unit (B). The base unit then optionally does a software validity check, optionally does a software update of the portable application stored on the peripheral device, and writes the connection parameters on the peripheral device (D) required for the peripheral device and base unit to find each other to the permanent storage (8). For example, when using WiFi, this would be the SSID, WEP/WPA2 keys and IP address of the base unit's receiver, as well as the port number used by the base node software although not all of this data is necessarily exchanged.

A client processing device that wants to have its arbitrary media content displayed on the central display connected to the base node (5) connects a peripheral device (D) to its USB port via (2). The peripheral device presents itself to the computer over interface (2) as a composite device comprising a mass storage device and a keypad. This has the major advantage that no specific driver is required, since all these devices are natively supported in every personal computer system that has a USB port. If

autorun is enabled, then the computer will automatically execute the client software (7) stored in mass storage (8) on the peripheral device. The first user interaction mentioned in the general case is then just the connection of the peripheral device to the USB port. If security measures disabled auto-run, the user needs to explore the mass storage on the mass storage of the peripheral device and start the portable application manually.

The portable application will use the wireless, e.g. WiFi or LiFi interface of the peripheral device (3) to connect to the correct base node. To know the right base unit to connect to, the configuration parameters needed to make this connection are stored in the database (12) on the mass storage device (8) during the pairing process described earlier.

Once the connection is made, the peripheral device goes into connected mode. This means that there is now at least one channel from the peripheral device to the base unit. The content is not shown yet. The LED (10) on the peripheral device now turns white to give a visual indication of this new state.

When the user at the computer (C) wants to show her content, she presses the button (9). When the button was previously in state “connected” (see figure 6), it will check the state of the base unit (P). If the base unit is not in state “full”, the peripheral device will send the screen scraped arbitrary media content to the base unit (B), which will add the media content to the composition on the central display. The peripheral device LED (10) now turns red to indicate “showing” state (figure 6).

The button (9) acts as a toggle. When the user presses the button again, that computer displays content will be removed from the projector. The LED (10) goes back to white.

Use of the auto-run feature is optional if possible and enabled on the computer (C) to start the client software (7) as soon as the peripheral device is plugged in. On Windows for example, this means mounting the peripheral device as a mass storage device and using the autorun.inf file stored on the peripheral device.

In many cases however, this auto-run feature will be disabled for security reasons. In that case, we will, if possible and enabled on the computer (C), use the auto-play feature to show the logo of the connected peripheral device on the desktop of the computer. The user then needs to double click on that logo to start the client software. If the auto-play feature as described above is also not possible or enabled, the user must browse to the file system of the connected peripheral device and start the application manually. This means double clicking the client.exe file on Windows, client.app on Mac OS/X or tapping the appropriate application icon on a tablet or any mobile device with touch screen.

Third Embodiment: Portable application stored on standard solid state memory such as a USB stick.

In the third embodiment, the portable application is stored on a solid state memory such as a regular USB memory stick (figure 7).

With a solid state memory such as a regular USB memory stick, there is no input device, visual indicator or transmitter of the kinds described above for the connection unit. This means that the system needs to:

- Use the transmitter/receiver from the client processing device.
- Use as input device a key or button on the client processing device like a physical key on the keyboard, a special mouse press, a button area on a touch screen, a button displayed on the screen to be clicked on with a mouse pointer.
- Present the visual indicator on the client processing device's display.

The client processing device then looks like figure 8.

This embodiment provides a peripheral interface such as the USB interface on any processing device acting as a host device such as a computer in a manner that is largely operating system independent. Installation of drivers and/or applications onto such a processing device as a computer is not necessary wherever pre-installed generic drivers are present. Administrator rights on the processing device such as a computer are preferably

not necessary. To avoid the need for administrator rights, this embodiment uses other peripheral device pre-installed drivers such as USB class drivers supported without any extra installation. This embodiment of the present invention routes at least screen scraped data presented by client software running on the processing device for transfer to a communications network via a network connection of the processing device. The client software is launched from the peripheral device such as the USB device as a portable application.

The first user operation then comprises:

- plugging in the solid state device such as a USB memory stick,
- starting the portable application (if autorun is disabled)
- configuring the transmitter, such as a wired or wireless network interface, on the client processing device to connect to the correct base node, using the configuration parameters (22) shown on the central display
- triggering the connection of the portable application with the base node, for example by interacting with an element on the GUI (18) of the portable application presented on the display of the client processing device.

Presenting visual feedback on user actions is in this embodiment also done using elements in the GUI of the display of the client operating device.

In this embodiment, the advantage of zero footprint is partly realized by the portable application in the sense that no software is installed on or copied to the client operating device, but there is a configuration change needed to connect the transmitter of the client operating device with the base node, which needs to be undone afterwards.

Optionally, the portable application can make the configuration changes to the transmitter for the user automatically in the background.

Advantages lost in this embodiment

- Partial loss of zero footprint nature of portable application
- More complex first user interaction
- More expertise required from user
- GUI needed on client operating device display, which is possibly also shown on

central display

- Need to find free key on client operating device when using physical key for second user action
- Network interface is blocked from other uses by portable application

5

Optionally, the last point can be avoided by using the base unit as a gateway to the network that the client operating device wanted to connect to through its own interface.

Advantages are:

- 10 - tight control of user connectivity to corporate network through settings on the base unit
- keep network connectivity intact even when transmitter is now also used for display purposes

- 15 Disadvantage is a higher vulnerability of the system because the display connection is now possible a doorway into the corporate network.

What remains as advantages are

- the availability of a physical medium to distribute the portable application to users
- 20 - no need to install or copy software to client operating device
- easy way to maintain software updates on the connection units (here: memory sticks) via the base unit
- possibility to write configuration data on the connection unit by the base unit, for example in the form of a configuration profile that can be read and used by the
- 25 client operating device

Fourth Embodiment: Software only client installed on the client processing device.

- 30 This embodiment is similar to the third embodiment, with as only difference that the software is copied on the client operating device (figure 9). In this case, no plug and play port such as a USB port is required on the client operating device.

This embodiment will typically be used for tablet PC's and mobile devices. In that case

- there is often no USB port available



- application distribution is easy and widely accepted through application stores

Fifth embodiment: Base node software OEM'ed to projector or display equipment

- 5 In this embodiment, the base node is not realized as a separate physical box, but integrated into the processing unit inside a display or projector. All other details are as previously described.

Sixth embodiment

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In this embodiment, the base node is not realized as a separate physical box, but integrated into the codec of a video conferencing equipment. All other details are as previously described.

- 15 Seventh embodiment: Remote meeting participant

In this embodiment, one or multiple client operating devices are not in the direct vicinity of the base node but on a remote location.

- 20 To accommodate this case, the following adaptations are needed:

- further compression and or scaling of the arbitrary media content to allow use of low bandwidth connection
- possibility to communicate connection parameters of the base node to a remote user
- 25 - connectivity of the base node to the WAN network to which the remote user is connected

All other details are as previously described.

- 30 Eighth embodiment: multiple base nodes

In this embodiment, multiple base nodes are used. This can be done for different purposes:

- connectivity of multiple central displays
- extension of real estate of central display

- connectivity of base nodes in different remote locations

This provides the advantage that one can present on multiple base units from a single peripheral device. This is useful for a number of cases:

- 5 - personal peripheral device: user can have a personal peripheral device that is paired with multiple meeting rooms that he regularly uses
  - use in meeting room with multiple base units each controlling a different display in the same meeting room
- 10 The proposal uses a special variant of the peripheral device called a multi base peripheral device. The multi base peripheral device is equipped with a rotating wheel around the circular central "show me" button. This could be a mechanical rotating multi-position switch or something like the touch wheel on the iPod classic.
- 15 The pairing of this multi-base variant of the peripheral device:
- the rotation wheel is put in the position of the corresponding base unit.
  - the peripheral device is paired to the base node in the regular way
  - the configuration parameters are stored in a permanent storage location; every position of the rotating wheel has a corresponding set of connection parameters (e.g. different rows in
  - 20 a table) each corresponding with a particular base

The connection of the peripheral device is as follows:

- multi-base peripheral device X is plugged into a PC
- rotation wheel on peripheral device X is put in position A
- 25 - peripheral device X reads configuration parameters in position A of its internal memory
- peripheral device X connects to base node A
- base node A indicates connection of multi-base peripheral device X on central display screen
- rotation wheel on peripheral device X is put in position B
- 30 - peripheral device X reads configuration parameters in position B of its internal memory
- peripheral device X connects to base node B
- base node B indicates connection of multi-base peripheral device X on screen
- continue until correct base is selected with rotation wheel
- click the peripheral device input device e.g. button to show content on central display of

base node

- rotating the wheel always first clicks away content from the base of the last position

Ninth embodiment

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Fig. 10 shows a peripheral device 47 in accordance with an independent embodiment of the present invention including an input device. This embodiment can be used with any of the embodiments described above.

10 The peripheral device is configured as a connection unit and is a physical device in the form of a connector for a plug and play interface of a user processing device as a host computer such as a USB connection, a flexible data and power connection connected to the connector and a base, the base having an actuator, e.g. a button configured to be an input device with the functions as described above.

15

The base and/or the actuator is preferably large in size, e.g. having a surface area between 100 and 14,400 square mm. The base can be square, rectangular, round, hexagonal, oval, polygonal in shape or any other ergonomically suitable shape. The actuator is preferably round but can be square, rectangular, hexagonal, oval, polygonal in shape etc. there can be  
20 more than one actuator on one base.

The length of the flexible data and power connection, e.g. cable is preferably adapted to place the peripheral device (when in its connected in its operating position), especially the base and the actuator, in the region between the boundary of the connected user processing  
25 device and the ergonomic boundary as defined above. In addition the flexible data and power connection should be adapted so that the base lies flat on the meeting table independent of the orientation of the connector needed to insert the connector into the plug and play interface.

30 The base preferably includes electronics such as having permanent storage for storing the portable application and the network configuration parameters, memory, a processing engine (e.g. CPU, FPGA), a wireless transmitter/receiver such as for WiFi or LiFi, a plug and play interface such as a USB interface, a LED ring or strip as visual indicator. The portable application can be stored on the peripheral device, i.e. in the base. The visual

indicator is for allowing user feedback from the connection unit of the status of any activity.

- Some examples for activation of the actuator which can be used with any of the embodiments of the present invention:

- Sound activated (hand clap, voice recognition, computer sound, music, ...)
- Remote controlled via wireless connected device (IR, Bluetooth, WiFi, LiFi...)
- Light activated
- Pressure activated, e.g. depression with a finger or hand.
- Touch activated
- Proximity ('near-touch' on the actuator or bringing the actuator close to some object)
- Biometric reader such as Fingerprint reader, Iris scanner, DNA analyser
- Keypad, e.g. for entering Keycode e.g. a password

#### Alternative embodiments

In the above embodiments, once the connection is made between the connection device and a host computer, the peripheral device goes into connected mode. This means that there is at least one channel from the peripheral device to the base node. In accordance with any of the embodiments of the present invention a plurality of channels can be set up between the connection device and the base node. These channels may be logical channels.

Some examples for such a multichannel arrangement may include the first and one or more of the additional channels:

- First channel is for the Scraped image stream (XDS)
- Second channel is for GPU commands (OpenGL, DirectX)
- Third channel is for Mouse pointer coordinates (absolute, relative)
- Fourth channel is for Mouse pointer icons
- Fifth channel is for Image data files (JPEG, PNG, GIF, ...)
- Sixth channel is for Multimedia data files or streams (MPEG2, MPEG4, OGG, H.26x, ...)

- Seventh channel is for Audio data files or streams (MP3, MP4, AAC, WMA, ...)
- Eighth channel is for text or Document data files (DOC, DOCX, PPT, PPTX, ODT, ODS, PDF, ...)
- 5      ○ Ninth channel is for transmission of a priority value 1,2, 3... as described above.

The support of audio, as discussed above when providing a seventh channel, in “screen scrape” like applications is non-trivial. When using devices which comprise a Windows  
10 OS, a large variety of audio devices exist, each offering a separate API. On devices comprising a Mac OS, special drivers like for instance SoundFlower needs to be installed. SoundFlower is a Mac OS X (10.2 and later) system extension that allows applications to pass audio to other applications. Hence such programs do not meet the zero footprint requirements.

15 The present invention provides in embodiments a method and a system for connecting a processing device such as a laptop, smartphone, PDA, computer, tablet and suchlike to a communications network, the processing device having a memory, a display and an operating system with pre-installed generic drivers providing a generic communications  
20 protocol for communication between processing device and a standard class of peripheral devices. The method and/or system are adapted for:

- a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;
- 25 b) setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
- c) coupling the processing device to a communications network via the peripheral device;
- d) routing audio data between the processing device and the communication network via the means for communication, wherein the generic communication protocol is used for  
30 transferring the audio data between the processing device and the peripheral device.

In particular the method and/or system can be adapted for:

- a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;

b) setting up, by means of a first pre-installed generic audio driver of the operating system, a means for audio communication between the peripheral device and the processing device and by means of a second pre-installed generic driver of the operating system, a means for data communication between the peripheral device and the processing device;

- 5 c) coupling the processing device to a communications network via the peripheral device;  
d) routing audio data between the processing device and the communication network via the means for audio communication, wherein the first pre-installed generic audio driver is used for transferring the audio data between the processing device and the peripheral device.

10

Embodiments of the present invention advantageously use the availability of a plug and play interface such as a USB interface. A USB device is connected to a suitable port on the processing device. . For example, on every PC-like platform, there is standard built-in support for a USB audio device. Thus there is a standard generic audio driver available.

- 15 Using this audio interface is thus possible without special driver installation.

On the peripheral device in embodiment of the present invention one can implement a virtual audio device. This peripheral device can present itself as an audio out device to the processing device such as a laptop, PDA, laptop, smartphone, tablet, PC, etc it is  
20 connected to. As soon as the peripheral device is plugged in, the user of the processing device will see an additional audio out interface displayed on the processing device display to which it can stream the audio. Audio configuration advantageously can be done using the standard audio interface GUI on the processing device. The peripheral device can present itself as a USB composite device.

25

The virtual audio device on the peripheral device is preferably adapted to analyse the incoming signal. If no audio is received, the incoming signal is discarded. If audio is received, the peripheral device preferably will initiate an additional TCP/IP socket connection to the base unit and the communications network. The audio can be then  
30 optionally time-stamped synchronous with the video stream for lip synchronization, optionally encoded into for instance Orgg/Vorbis, optionally encrypted using for instance CryptoPP and sent over the TCP/IP link using the RTP/RTCP protocol. If no audio signal is received, then no audio packets will preferably be sent over the network to limit bandwidth usage. The audio channel over TCP/IP is disconnected synchronously with the

video channel.

In an embodiment of the present invention, the base unit is adapted to receive the audio stream packets for instance encoded in RTP and controlled with RTCP over a TCP/IP  
5 socket. It will preferably then decrypt and decode the contained encoded audio stream if required, and deliver the resulting signal to the physical audio device in the base unit. The embedded time stamps can be used to synchronize the audio and video streams.

When audio is present on the client processing device to which the peripheral device is  
10 connected and made available to the USB audio device presented by the peripheral device, then it will be streamed to the base unit. The base unit is notified that the additional multimedia stream presented to it contains audio. This additional meta-information is used in the auto composition engine on the base unit. Without audio, up to four such streams can be handled for example by the base unit simultaneously.

15 Thus, instead of "scraping" the audio like e.g. prior art products do, embodiments of the present invention provide a channel, as described above, which is adapted to capture the audio on the peripheral device using only standard drivers and not requiring any software installation in or on the processing device. The peripheral device preferably acts as a  
20 composite device comprising for instance a (virtual) audio speaker device. However instead of operating like a speaker the audio is channelled over the communications network. The peripheral device can preferably capture the audio stream with a device driver, for instance a built in ALSA UAC1, and stream the audio to the base unit. In addition, to provide lip synchronisation, embodiments of the present invention further  
25 provides a timer or uses a timer present in a processing device that preferably time stamps both the audio and the video stream. This time stamp is encoded in the video frames and passed on in the ALSA communication stream to the peripheral device. The peripheral device then encodes this time stamp into the audio stream (for instance RTP audio stream) that is streamed to the base unit. At the receiving end, the audio and video streams are then  
30 preferably recombined taking into account the time stamp to reach lip synchronization.

A detailed embodiment of the present invention for audio capture will be described with reference to Fig. 11.

In this embodiment a peripheral device 32 as described above is used that can be coupled with a processing device 31 such as a laptop, tablet, smartphone, PDA, personal computer etc. The coupling can be by a plug and play interface such as a USB interface that has generic drivers installed on the processing device. For example the peripheral device 32  
5 can be physically inserted into a USB port on the processing device 31. Commercially available processing devices currently support external USB audio devices through a generic built-in USB audio software driver. In the future any modifications, improvements or replacements of universal interfaces will have an equivalent audio solution. The generic drivers installed on the processing device make the audio available at the port 8 to the  
10 peripheral device 32. For example, port 8 can be a USB port using a standardized interface, e.g. mostly UAC1. On the peripheral device 32 there is a matching port 11. In accordance with this embodiment audio data is captured at this interface 8-11 internally in the peripheral device 32. This data is then optionally re-encoded and streamed to the communications network to which the peripheral device 32 has access. An example is a  
15 wireless communications network such as WiFi or LiFi. The communications network has a base node which can be in the form of a base station or base unit 33. The base unit can be a central base unit for use in meetings. For use in displaying a presentation this base unit is coupled to a display device as described for other embodiments of the present invention. In order to provide lip synchronicity, the audio and video signals captured are provided with a  
20 high resolution time stamp upon packaging. By doing so, the combined audio and video signals can be reconstructed at the receiving end regardless of the paths and delays of the different packets.

For the processing of video data from the processing device 31, a software 2 is executed on  
25 the processing device 31 e.g. a client PC, i.e. a screen scraping software as described in the other embodiments. This software 2 can be stored as a software program 30 in mass storage 12 on the peripheral device 32 as described in the other embodiments. This software program 30 is loaded onto the processing device 31 when it is coupled thereto, either automatically or by user action as described in the other embodiments. When the  
30 software 2 is running on the processing device 31 it is preferred if it leaves zero footprint on termination has been described for other embodiments. That software 30 when executed on the processing device 31 captures the video data that is available on the processing device, e.g. from a presentation or video that is running on the processing device as described in the other embodiments. For example, the software 30 when executed on the



processing device 31, is adapted to screen scrape, e.g. to read one or more video frame buffers 1 from the graphics card in the processing device 31. Generally the processing device 31 will have its own display and hence will have a graphics card or something equivalent with a buffer for storing video data. This read video information is preferably  
5 time stamped with a clock 9, to be able to later synchronize the captured video signal with the related audio signal. The video signal is then encoded in a video encoder 3, packetized in a video packetizer 4, prepared in an HID protocol packetizer 5 for transport over the plug and play interface using a generic driver 10, such as over a USB interface using generic pre-installed drivers, e.g. a generic pre-installed Human Interface Driver (HID).  
10 The audio data is offered on the plug and play port e.g. the USB port 8.

On the peripheral device 32 the video packets are received at the corresponding plug and play port, e.g. the USB port 11, read by the Human Interface Driver (HID) interface handler 13, unpacked to remove HID protocol headers in an unpacker 20 and then  
15 transmitted to the communications network by a transmitter 21. The network can be wireless for example WiFi or LiFi network.

Having been routed over a communications network to the base unit 33, the incoming stream is read from the communications interface such as a WiFi access point 22,  
20 unpacked in an unpacker 25, decoded in a decoder 26 and then inserted into a suitable composition such as an OpenGL based composition in the compositor 29 for display on a central display device.

With reference to the audio data on the processing device 31 such as a client PC, the audio  
25 is sent over a port using generic drivers such as over a USB port 8 using the standard built-in generic audio driver such as UAC driver 7. On the peripheral device 32, the audio packets are read from the generic port, e.g. USB port 11 by a dedicated audio device 14. These packets are then processed by any of a mixer a rate converter, an echo canceller, noise canceller or similar. Any of the mixing, rate conversion, echo cancelling, noise  
30 cancelling can be executed using an ALSA driver 18. The ALSA driver offers the packets to a dummy audio device 16 such as an audio scraper. In this audio device 16 the audio packets can be time stamped from the clock 15 that can be synchronized with clock 9 of the processing device 31. This information is then encoded in an encoder 17 and packetized in a packetizer 19]before being transferred to the communications network. The

network can be a wireless network such as a WiFi or LiFi network For this purpose a suitable transmitter 21 is provided in the peripheral device 32. On the base unit 33 the audio information stream is recovered at a suitable communications interface such as the WiFi access point 22. The audio is then unpacked in an unpacker 23, decoded in a decoder 24 before being before being offered to an audio mixer 28. In order to synchronise the audio and video streams these are both sent to a synchronizer 27 in which the two streams are synchronized and thus keep lip synchronization.

In the above embodiments, a particular method of pairing the peripheral device with the base node has been described. Any of the embodiments of the present invention may include other pairing mechanisms of which some examples are given below.

- Some examples for pairing

- Plug in the peripheral device, to a generic peripheral device port such as a USB port of the base node or other USB enabled device. Pairing info is transmitted over the generic peripheral interface such as USB.

- The Signal strength of the wireless channel to the base node is used to identify which base node is to be used

- The Signal strength of the wireless channel or any other channel. Example is an NFC/RFID transmitter can be provided underneath the meeting room table. Putting the user processing device such as a laptop and the peripheral device plugged in on this table automatically pairs the peripheral device with the base of this meeting room

- Manual pairing (e.g. by entering IP address, hostname, wireless ID (like SSID on WiFi))

What is claimed is

1. A method for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system with pre-installed generic drivers providing a generic communications protocol for communication between  
5 processing device and a standard class of peripheral devices, the method comprising:
  - a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;
  - b) setting up, by means of a first pre-installed generic audio driver of the operating system,  
10 a means for audio communication between the peripheral device and the processing device and by means of a second pre-installed generic driver of the operating system, a means for data communication between the peripheral device and the processing device;
  - c) coupling the processing device to a communications network via the peripheral device;
  - d) routing audio data between the processing device and the communication network via  
15 the means for audio communication, wherein the first pre-installed generic audio driver is used for transferring the audio data between the processing device and the peripheral device.
2. The method of claim 1 wherein Step b) comprises presenting the peripheral device to  
20 the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver.
3. The method of claim 1 wherein Step b) comprises presenting the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver  
25 is a mass storage device driver.
4. The method of claim 1 wherein Step b) comprises presenting the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers  
30 drive different device interfaces independently.
5. The method of any of claims 1 to 4 wherein a client application is stored on the peripheral device which when run on the processing device obtains screen scraped data.
6. The method of claim 5 wherein the client application is a portable application.

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7. The method of any of the claims 1 to 6 wherein the peripheral device is adapted to analyse an incoming signal from the processing device and if no audio is received, the incoming signal is discarded.

5

8. The method of claim 7 wherein if audio is received, the peripheral device will initiate an additional connection to the base unit through the communications network.

9. The method of any of claims 1 to 8 further comprising time-stamping synchronously with the audio with the data stream.

10

10. The method of claim 9 further comprising encoding, optionally encrypting the audio data.

11. A system for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system with pre-installed generic drivers providing a generic communications protocol for communication between processing device and a standard class of peripheral devices, the system comprising:

15

a) means for coupling a peripheral device to the processing device, the peripheral device

20

having a transceiver;

b) means for setting up, by means of a first pre-installed generic audio driver of the operating system, a means for audio communication between the peripheral device and the processing device and by means of a second pre-installed generic driver of the operating system, a means for data communication between the peripheral device and the processing device;

25

c) means for coupling the processing device to a communications network via the peripheral device;

d) means for routing audio data between the processing device and the communication network via the means for audio communication, wherein the first pre-installed generic audio driver is used for transferring the audio data between the processing device and the peripheral device.

30

12. The system of claim 11 further comprising means for presenting the peripheral device to the processing device as a human interface device and wherein the pre-installed generic

driver is a human interface device driver.

13. The system of claim 11 further comprising means for presenting the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic  
5 driver is a mass storage device driver.

14. The system of claim 11 further comprising means for presenting the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.  
10

15. The system of any of claims 11 to 14 wherein a client application is stored on the peripheral device which when run on the processing device obtains screen scraped data.

16. The system of claim 15 wherein the client application is a portable application.  
15

17. The system of any of the claims 11 to 16 wherein the peripheral device is adapted to analyse an incoming signal from the processing device and if no audio is received, the incoming signal is discarded.

20 18. The system of claim 17 wherein if audio is received, the peripheral device will initiate an additional connection to the base unit through the communications network.

19. The system of any of claims 11 to 18 further comprising time-stamping synchronously with the audio stream with the data stream.  
25

20. The system of claim 19 further comprising means for encoding, optionally encrypting the audio data.

21. An electronic meeting tool for use with the system according to any of the claims 11 to  
30 20 and for communicating arbitrary media content from users at a meeting comprising: a node configuration means adapted to operate a display node of a communications network, the display node being coupled to a first display, the node configuration means being adapted to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display; and

at least one peripheral device adapted to communicate the user selected arbitrary media content via the communications network, wherein the peripheral device is a connection unit comprising:

- 5           (a) a connector adapted to couple to a port of a processing device having a second display, a memory and an operating system; and  
            (b) a transmitter for communicating with the communications network,

10           a program adapted to be loaded onto the processing device and to run on the operating system of the processing device, said program being adapted to obtain user selected arbitrary media content, said program leaving a zero footprint on termination, and an input device to allow the user to carry out a user action that triggers transfer of said user selected arbitrary media content to said transmitter through said port.

15           22. The electronic meeting tool of claim 21 wherein the program is stored on the peripheral device.

20           23. The electronic meeting tool of claim 21 or 22 wherein the transmitter is a wireless transmitter or transceiver.

24. The electronic meeting tool of any of the claims 21 to 23 wherein the peripheral device is a plug-and-play device.

25           25. The electronic meeting tool of any of the claims 21 to 24 wherein the program is adapted to screen scrape content of the second display.

26. The electronic meeting tool of any of the claims 21 to 25 wherein the input device is physical actuator coupled to the peripheral device.

30           27. The electronic meeting tool of claim 26 wherein the physical actuator has a surface area of between 100 and 14,400 square mm.

28. The electronic meeting tool of any of the claims 21 to 27 wherein the input device is a key displayed on the second display.

29. The electronic meeting tool of claim 28 wherein the key displayed on the second display is not screen scraped by the program.

- 5 30. A method for connecting a processing device to a communications network and for use with the system according to any of the claims 11 to 20, the processing device having a memory, a display and an operating system with at least one pre-installed generic driver providing a generic communications protocol for communication between processing device and a standard class of peripheral devices, the method comprising the steps of:
- 10 a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;
- b) setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
- c) coupling the processing device to a communications network via the peripheral device;
- 15 d) routing screen scraped data between the processing device and the communication network via the means for communication, wherein the generic communication protocol is used for transferring the screen scraped data between the processing device and the peripheral device.
- 20 31. The method of claim 30 wherein Step b) comprises presenting the peripheral device to the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver.
32. The method of claim 30 wherein Step b) comprises presenting the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.
- 25 33. The method of claim 30 wherein Step b) comprises presenting the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers
- 30 drive different device interfaces independently.
34. The method of any of claims 30 to 33 wherein a client application is stored on the peripheral device which when run on the processing device obtains the screen scraped data.

35. The method of claim 34 wherein the client application is a portable application.

36. A peripheral device for use with the system according to any of the claims 11 to 20 and  
5 for providing communication connectivity to a processing device which is provided with  
memory, a display and an operating system with at least one pre-installed generic driver  
providing a generic communication protocol for communication between the processing  
device and a standard class of peripheral devices, the peripheral device comprising a  
memory in which executable software code is stored for execution on the processing  
10 device, said executable software code comprising:

a first software code portion for setting up, by means of the pre-installed generic driver of  
the operating system, a means for communication between the peripheral device and the  
processing device;

a second software code portion for connecting the processing device to a communications  
15 network via the peripheral device, the peripheral device having a transceiver;

a third software code portion for screen scraping data from the processing device; and  
a fourth software code for routing screen scraped data between the processing device and  
the communications network over the means for communication; wherein the first  
software code portion is adapted to use the generic communication protocol for  
20 transferring the screen scraped data between the processing device and the peripheral  
device.

37. The peripheral device of claim 36, wherein the first software code portion is adapted to  
present the peripheral device to the processing device as a human interface device and  
25 wherein the pre-installed generic driver is a human interface device driver.

38. The peripheral device of claim 36, wherein the first software code portion is adapted to  
present the peripheral device to the processing device as a mass storage device and  
wherein the pre-installed generic driver is a mass storage device driver.

39. The peripheral device of claim 36, wherein the first software code portion is adapted to  
present the peripheral device to the processing device as a composite device and wherein  
pre-installed generic drivers drive different device interfaces independently.



40. The peripheral device of any of the claims 36 to 39 wherein said executable software code comprises fifth code for providing a means for connecting to the communications network including a base node.

5 41. The peripheral device of any of the claims 36 to 40 wherein said executable software code comprises sixth code for providing means for capturing video frame buffers of the processing device.

10 42. The peripheral device of any of the claims 36 to 41 wherein said executable software code comprises seventh code for providing a means for encoding, compressing and optionally encrypting the screen scraped data and sending the screen scraped data the communication network.

15 43. The peripheral device of any of the claims 36 to 41 wherein said executable software code comprises eighth code for providing a means for handling the peripheral device.

44. The peripheral device of any of the claims 40 to 43 wherein said executable software code comprises ninth code for providing means for initiating connection to the base node.

20 45. The peripheral device of any of the claims 36 to 44 wherein said executable software code comprises tenth code for receiving inputs from an input device on the peripheral device.

25 46. The peripheral device of any of the claims 36 to 45 wherein said executable software code comprises eleventh code for providing a means for sending state changes to the visual indicator on the peripheral device.

47. The peripheral device of any of the claims 36 to 46 wherein said executable software code comprises Twelfth code for providing a means for presenting to the user a GUI.

30

48. The peripheral device of any of the claims 36 to 47 wherein said executable software code comprises thirteenth code for presenting a GUI for administration of the said executable software code when executed as a portable application.

49. The peripheral device of any of the claims 36 to 48 wherein said executable software code comprises fourteenth code for providing a means for displaying and activating a key on the display of the client processing device for allowing a user to input the start the transfer of data from the processing device to the base node.

5

50. A peripheral device use with the system according to any of the claims 11 to 20 and for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing a generic communication protocol for communication between the processing  
10 device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:

a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the  
15 processing device;

a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a transceiver; and

a third processing software code for routing data between the processing device and the communications network over the means for communication; wherein the first software

20 code portion is adapted to use the generic communication protocol for transferring the data between the processing device and the peripheral device, and  
an input device coupled to the peripheral device, the input device being adapted to react to a user action to trigger the transfer of the data from the processing device to the peripheral device.

25

51. The peripheral device of claim 50, wherein the first software code portion is adapted to present the peripheral device to the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver.

30 52. The peripheral device of claim 50, wherein the first software code portion is adapted to present the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.

53. The peripheral device of claim 50, wherein the first software code portion is adapted to

present the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

54. The peripheral device of any of the claims 50 to 53 wherein the input device is  
5 physical actuator coupled to the peripheral device.

55. The peripheral device of claim 54 wherein the physical actuator has a surface area of between 100 and 14,400 square mm.

10 56. The peripheral device of any of the claims 50 to 55 wherein the input device is a key for display on the display.

57. The peripheral device of any of the claims 50 to 56 wherein said executable software code comprises fourth code for providing a means for connecting to the communications  
15 network including a base node.

58. The peripheral device of any of the claims 50 to 56 wherein said executable software code comprises fifth code for providing a means for capturing video frame buffers of the processing device.

20 59. The peripheral device of claim 58 wherein said executable software code comprises sixth code for providing a means for encoding, compressing and optionally encrypting the video frames and sending them over a secure link to the base node.

25 60. The peripheral device of any of the claims 50 to 59 wherein said executable software code comprises seventh code for providing a means for handling the peripheral device.

61. The peripheral device of claim 59 or 60 wherein said executable software code comprises eighth code for providing a means for initiating connection to the base node.

30 62. The peripheral device of any of the claims 50 to 61 wherein said executable software code comprises ninth code for receive inputs from an input device on the peripheral device.

63. The peripheral device of any of the claims 50 to 62 wherein said executable software code comprises tenth code for providing a means for sending state changes to the visual indicator on the peripheral device.

5 64. The peripheral device of any of the claims 50 to 63 wherein said executable software code comprises eleventh code for providing a means for presenting the user a GUI.

65. The peripheral device of any of the claims 50 to 64 wherein said executable software code comprises twelfth code for presenting GUI for administration of the executable  
10 software code when executed as a portable application.

66. The peripheral device of any of the claims 57 to 65 wherein said executable software code comprises thirteenth code for providing a means for displaying and activating a key on the display of the processing device for allowing a user input to start the transfer of data  
15 from the processing device to the base node.

67. A peripheral device use with the system according to any of the claims 11 to 20 and for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver  
20 providing a generic communication protocol for communication between the processing device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:  
a first software code portion for setting up, by means of the pre-installed generic driver of  
25 the operating system, a means for communication between the peripheral device and the processing device;  
a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a transceiver;  
a third software code portion for receiving media content from the network and for  
30 displaying the media content on the display in accordance with a set of rules; wherein the first software code portion is adapted to use the generic communication protocol for transferring the media content between the peripheral device and the processing device.

68. The peripheral device of claim 67 wherein said executable software code comprises

fourth code for providing a means for correctly configuring a receiver as an access point.

69. The peripheral device of claim 67 or 68 wherein said executable software code comprises fifth code for providing a means for listening for output of connection units  
5 trying to connect on a specific port.

70. The peripheral device of any of the claims 67 to 69 wherein said executable software code comprises sixth code for providing a means for a GUI for administration purposes.

10 71. The peripheral device of any of the claims 67 to 70 wherein said executable software code comprises seventh code for providing a means for publishing its presence over the network using the zeroconf protocol.

15 72. The peripheral device of any of the claims 67 or 71 wherein said executable software code comprises eighth code for providing a means for accepting and installing software updates.

20 73. The peripheral device of any of the claims 67 or 72 wherein said executable software code comprises ninth code for providing a means for providing facilities for pairing of connection units to the processing device.

25 74. The peripheral device of any of the claims 67 or 73 wherein said executable software code comprises tenth code for providing a means for auto-composing of different incoming arbitrary media streams and rendering of composited image on display.

75. The peripheral device of any of the claims 67 or 74 wherein said executable software code comprises eleventh code for providing a means for receiving, decrypting and decoding incoming arbitrary media content.

30 76. The peripheral device of any of the claims 67 or 75 wherein said executable software code comprises twelfth code for scaling of incoming arbitrary media streams.

77. The peripheral device of any of the claims 67 or 76 wherein said executable software code comprises thirteenth code for providing a means for displaying incoming arbitrary

media content in accordance with a set of rules.

78. A method for use with the system according to any of the claims 11 to 20 and for communicating arbitrary media content from users at a meeting comprising:

- 5 operating a display node of a communications network, the display node being coupled to a first display, to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display; and  
connecting a peripheral device to a port of a processing device and communicating the user selected arbitrary media content via the communications network,  
10 loading a program onto the processing device and running the program on the operating system of the processing device to obtain user selected arbitrary media content, said program leaving a zero footprint on termination, and  
triggering transfer of said user selected arbitrary media content to said transmitter through said port after a user action on an input device.

15

79. A peripheral device for use with the system according to any of the claims 11 to 20, comprising:

a base

a connector for connection to a plug and play port of a host processing device,

- 20 a flexible connection between the base and the connector for transferring data signals and power,

an actuator on the base for actuating a signal and for transferring the signal to the connector for transfer to the port, wherein the base has electronics comprising permanent storage for storing a portable application, a processing engine, a transceiver and a visual  
25 indicator.

80. A method for use with the system according to any of the claims 11 to 20 and for providing communication connectivity from a processing device,  
setting up a communications network between a base node of the communications network  
30 and a peripheral device coupled to the processing device;  
transferring media content between the processing device and the peripheral device,  
transmitting the media content from the peripheral device to the communications network,  
receiving media content from the communications network at the base node and displaying the media content on a display in accordance with a set of rules.

81. Any of the above claims as software code stored on a non-transitory storage medium.

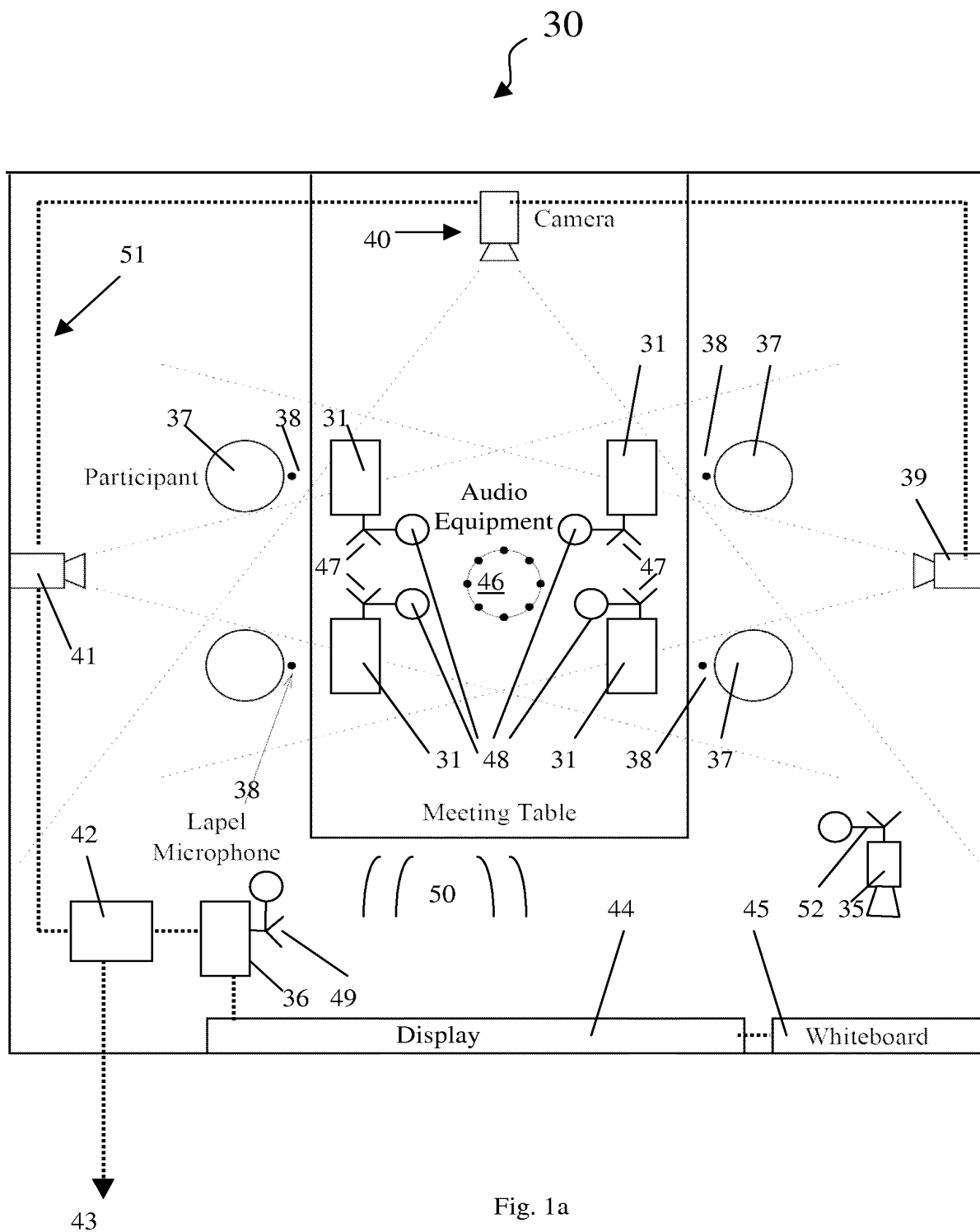


Fig. 1a



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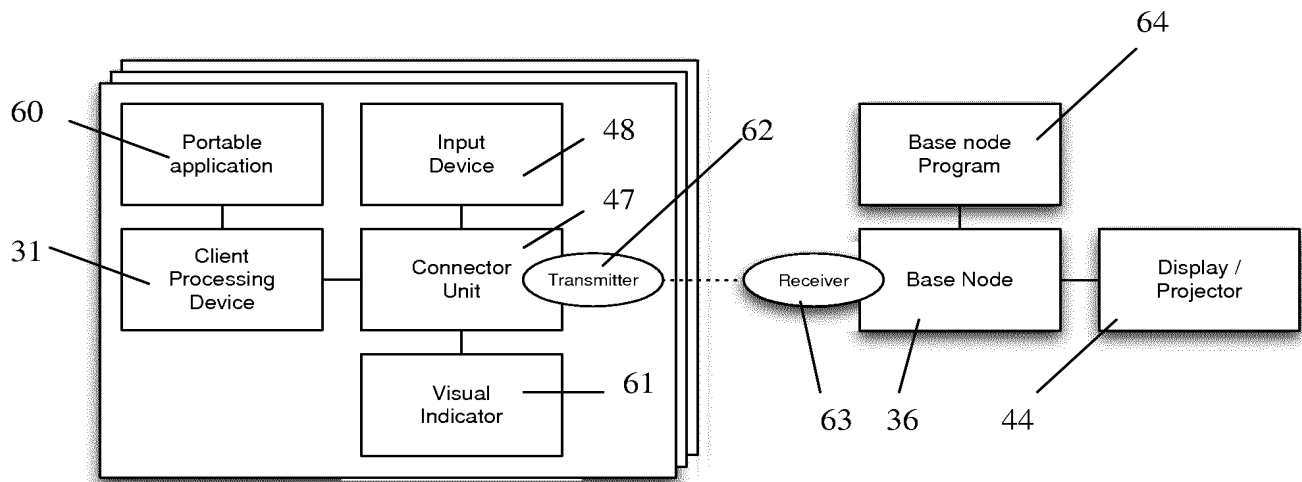


Fig. 1b

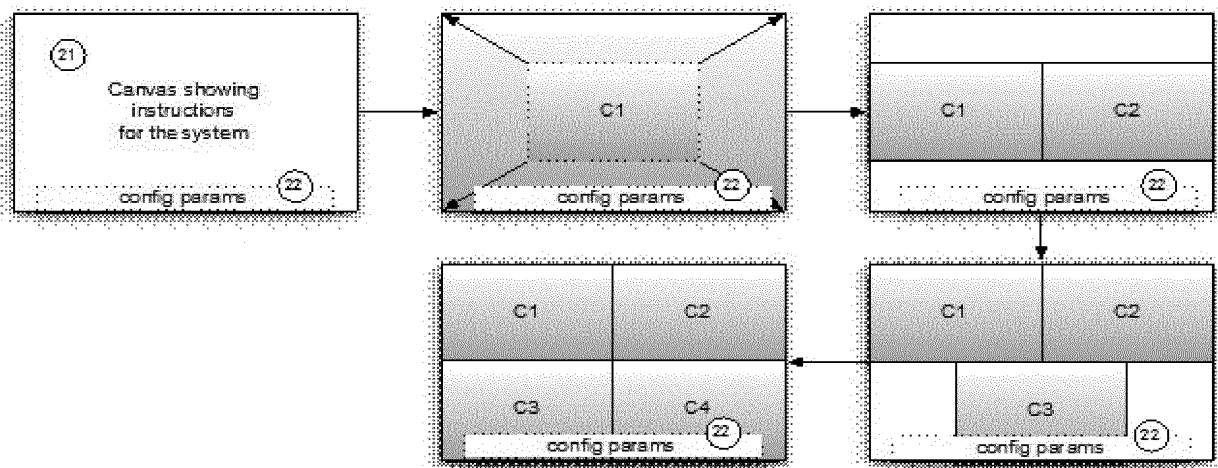


Fig. 2

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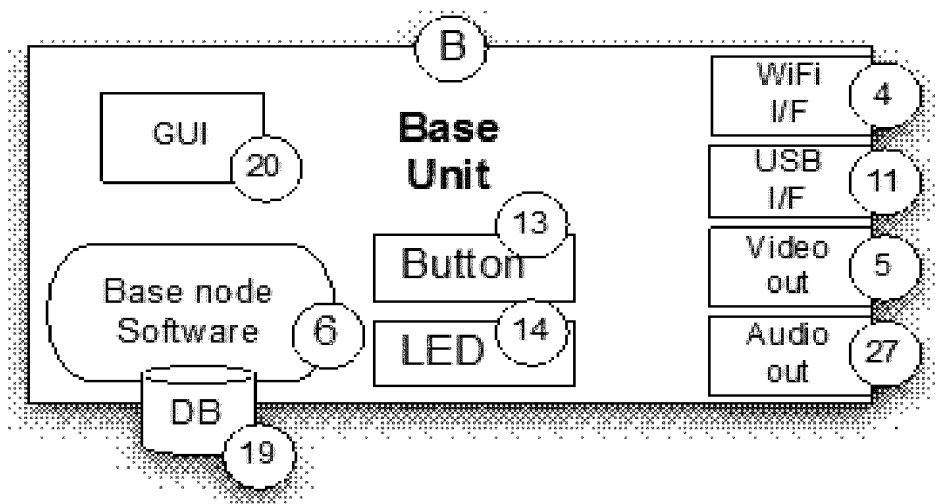


Fig. 3

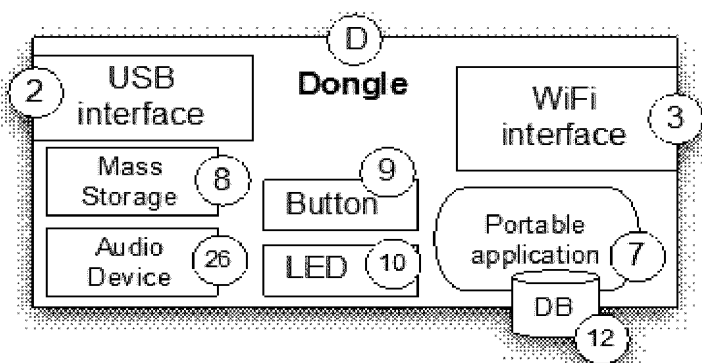


Fig. 4

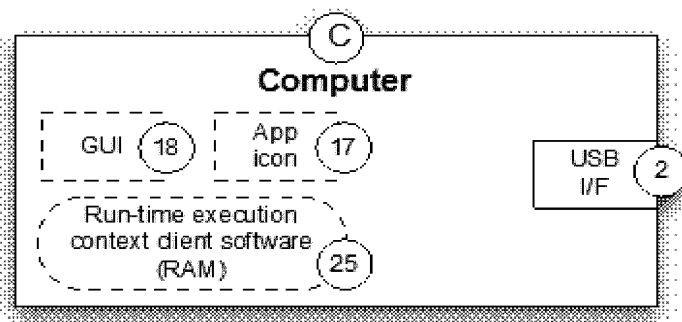


Fig. 5

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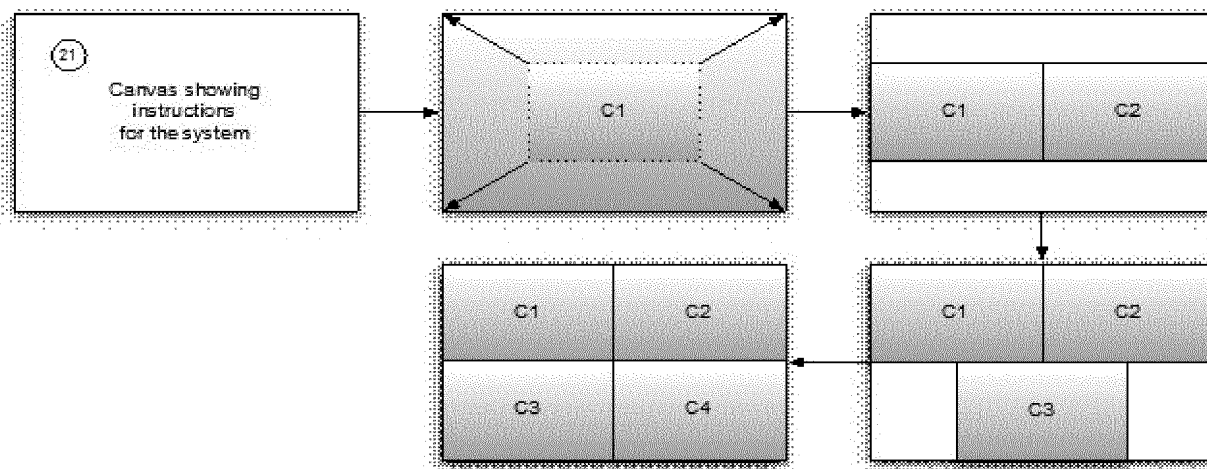


Fig. 6

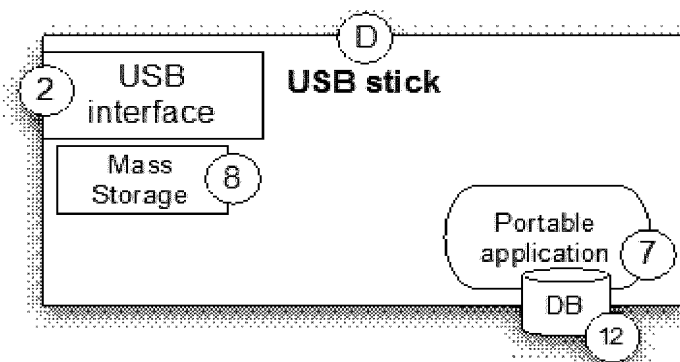


Fig.7

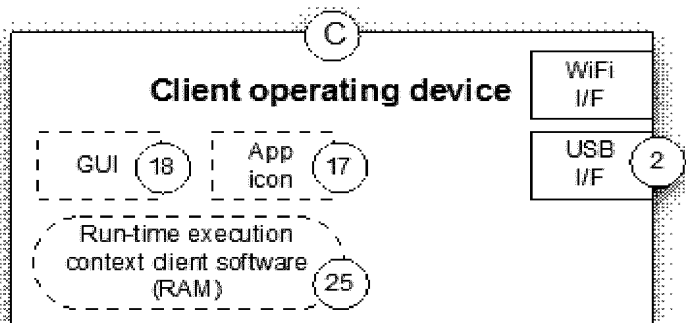


Fig. 8

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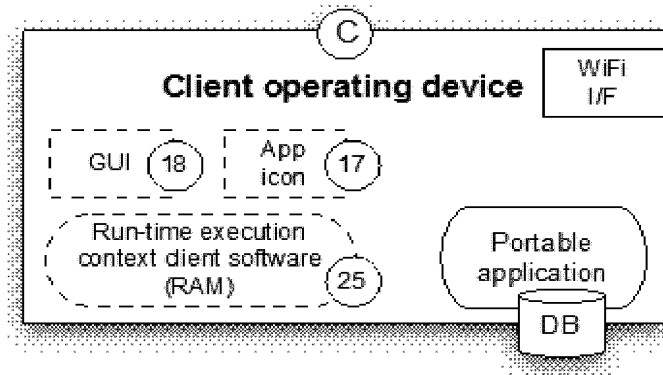


Fig. 9

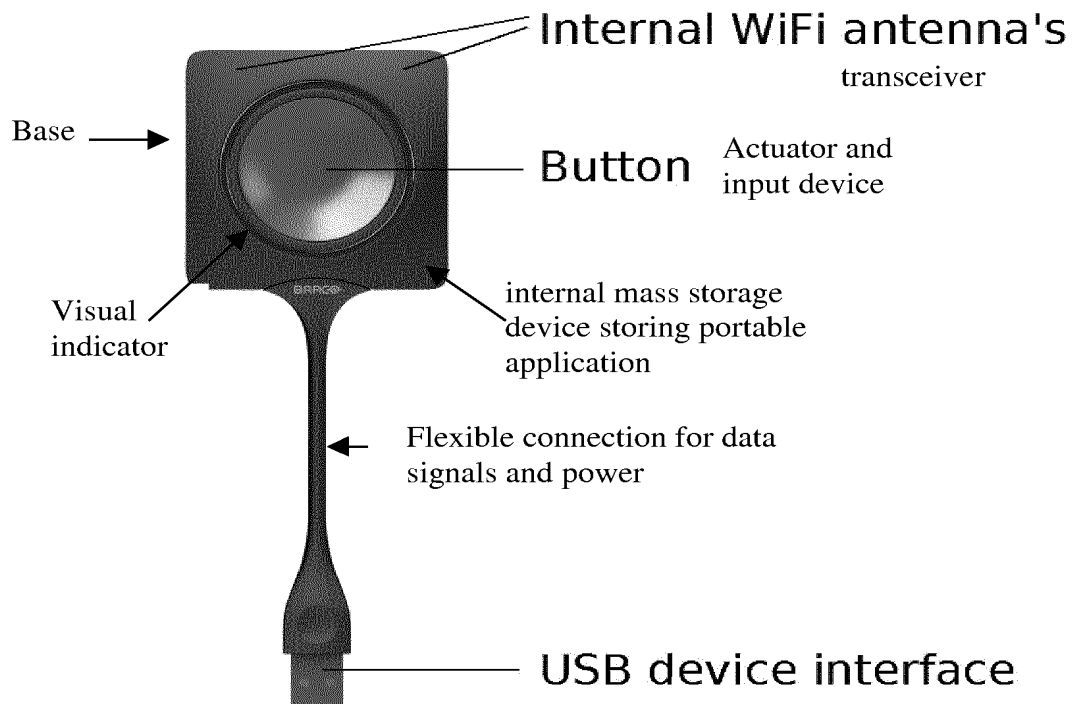


Fig. 10

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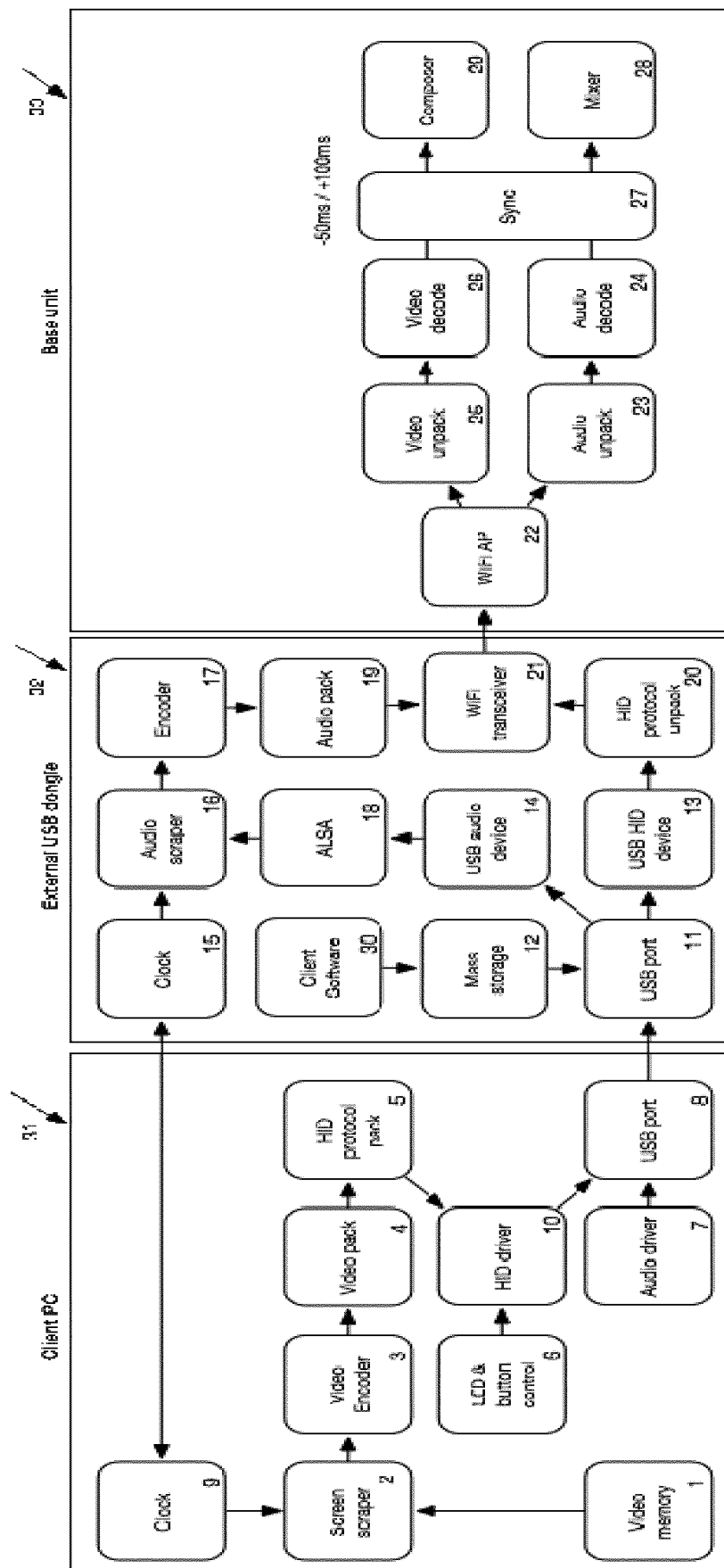


FIG. 11

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**Continuation Patent Application of:**  
**U.S. App. No. 14/344,836**

<b>Parent Filing Date:</b>	March 3, 2015	<b>Parent Art Unit:</b>	2184
<b>First Inventor:</b>	Koen Simon Herman BEEL	<b>Customer No.:</b>	23364
<b>Attorney No.:</b>	BEEL3004C/TL	<b>Confirm. No.:</b>	TBD
<b>For:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

**PRELIMINARY AMENDMENT BEFORE EXAMINATION**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

**INTRODUCTORY COMMENTS**

This paper accompanies documents submitted to initiate processing of the above-identified patent application.

Before calculating the filing fee and before formal examination of the application on the merits, it is desired to amend the application in accordance with the following particulars.

**AMENDMENTS**

**AMENDMENT TO THE ABSTRACT**

An amendment to the abstract is shown in the following pages under the heading AMENDMENT TO THE ABSTRACT.

**AMENDMENT TO THE SPECIFICATION**

An amendment to the specification is shown in the following pages under the heading AMENDMENT TO THE SPECIFICATION.

**AMENDMENTS TO THE CLAIMS**

The claims are amended as shown in the following pages under the heading "LIST OF CURRENT CLAIMS". This listing of claims supersedes all prior listing of claims presented in this application, shows currently proposed amendments and shows the current status of all claims in the application.

Attorney Docket No. BEEL3004C/TL

**AMENDMENTS TO THE ABSTRACT**

The original Abstract is cancelled in favor of the new Abstract presented on the following page.

**ABSTRACT**

An electronic meeting tool and method for communicating arbitrary media content from users at a meeting comprises a node configuration means adapted to operate a display node of a communications network, the display node being coupled to a first display. The node configuration means is adapted to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display. A peripheral device adapted to communicate the user selected arbitrary media content via the communications network is a connection unit comprising a connector adapted to couple to a port of a processing device having a second display, a memory and an operating system, and a transmitter. A program is adapted to obtain user selected arbitrary media content, said program leaving a zero footprint on termination. The user may trigger transfer of said user selected arbitrary media content to said transmitter.



**AMENDMENT TO THE SPECIFICATION**

Please add the following paragraph before page 1, line 3 of the specification:

--This application is a continuation application claiming benefit to U.S. patent application 14/344,836 filed March 3, 2015, which is a national stage application of international application PCT/EP2012/068167, filed September 14, 2012, which claims the benefit of U.S. provisional application No. 61/534,592 filed September 14, 2011, U.S. provisional application No. 61/635,234, filed April 18, 2012, and is a continuation-in-part application U.S. application 13/270,659, which was filed October 11, 2011 and granted as U.S. patent 8,756,348, where the entirety of said applications are incorporated herein by reference.--

**LIST OF CURRENT CLAIMS**

1-81. (Cancelled)

82. (New) A method for connecting a processing device to a communications network, the processing device having a memory, a display, an operating system and communication between processing device and a class of peripheral devices, the method comprising:

a) coupling an external peripheral device physically to a port of the processing device, the external peripheral device having a transceiver and a connector configured to couple to the port of the processing device;

b) communicating audio data and display data from the processing device to the external peripheral device;

c) reading the audio data from the port using an audio device on the external peripheral device,

d) connecting the processing device to a communications network via the transceiver, and

e) display data and audio data being routed between the processing device and the communication network via the transceiver and further to a base node.

83. (New) The method of claim 82, wherein the audio device comprises an audio output adapter device which is configured as a virtual audio device to transfer the audio data from the processing device to the base node via the communications network.

84. (New) The method of claim 82, further comprising presenting the external peripheral device to the processing device as any of the following:

a human interface device;

a mass storage device; and

a composite device.

85. (New) The method of claim 82, wherein a client application is stored on the external peripheral device which when run on the processing device obtains screen scraped data.

86. (New) The method of claim 85, wherein the client application is a portable application.

87. (New) The method of claim 82, wherein the external peripheral device analyzes an incoming signal from the processing device and if no audio data is received, the incoming signal is discarded and if audio data is received, the external peripheral device initiates a TCP/IP socket connection to the base unit through the communications network.

88. (New) The method of claim 82, further comprising time-stamping synchronously a stream of the audio data with a stream of the display data.

89. (New) The method of claim 88, further comprising encoding, optionally encrypting the audio data.

90. (New) A system for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system and communication between processing device and a class of peripheral devices, the system comprising:

a) means for coupling an external peripheral device physically to a port of the processing device, the external peripheral device having a transceiver and a connector configured to couple to the port of the processing device;

b) means for display data communication and audio communication between the external peripheral device and the processing device;

wherein the external peripheral device is configured in a way to connect the processing device to a communications network via the transceiver; and

means for routing display data and audio data between the processing device and the communication network via the means for display data and audio data communication and the transceiver to a base node.

91. (New) The system of claim 90, wherein the external peripheral device comprises an audio device which is configured in a way to be implemented as a virtual audio device to transfer the audio data from the processing device to the base node via the communications network.

92. (New) The system of claim 91, further comprising any of the following:

means for presenting the external peripheral device to the processing device as a human interface device,

means for presenting the peripheral device to the processing device as a mass storage;

and

means for presenting the external peripheral device to the processing device as a composite device.

93. (New) The system of claim 92, wherein a client application is stored on the external peripheral device which when run on the processing device obtains screen scraped data.

94. (New) The system of claim 93, wherein the client application is a portable application.

95. (New) The system of claim 92, wherein the external peripheral device is adapted to analyse an incoming signal from the processing device and if no audio is received, the incoming signal is discarded.

96. (New) The system of claim 95, wherein if audio is received, the external peripheral device is adapted to initiate an additional connection to the base unit through the communications network.

97. (New) The system of claim 90, further comprising time-stamping synchronously the audio data with the display data.

98. (New) The system of claim 90, further comprising means for encoding, optionally encrypting the audio data.

99. (New) A peripheral device for providing communication connectivity to a processing device which is provided with memory, a display and an operating system and for communication between the processing device and a class of peripheral devices, the peripheral device comprising a connection configured to be physically coupled to a port of the processing device and the peripheral device being adapted to work with executable software code, said executable software code comprising:

a first software code portion for setting up, a means for display data audio data communication between the peripheral device and the processing device;

a second software code portion for connecting the processing device to a communications network via a transceiver of the external peripheral device; and

a third software code portion for routing the display data and the audio data between the processing device and the communication network via the transceiver to a base node.

100. (New) A method for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system, the method comprising:

a) coupling an external peripheral device physically to a port of the processing device, wherein the peripheral device comprises a wireless transceiver and a connector, said connector configured to couple to the port of the processing device;

b) setting up audio communication between the peripheral device and the processing device and setting up data communication between the peripheral device and the processing device;

c) the peripheral device being configured to connect the processing device to a communications network via the wireless transceiver;

d) routing audio data from the processing device to the wireless transceiver via the connector of the peripheral device and the audio communication and routing the audio data from the wireless transceiver of the peripheral device to a base node over the communications network via at least one channel created between the external peripheral device to the base node.

101. (New) The method of claim 100, wherein the external peripheral device is configured to analyze an incoming signal from the processing device and if no audio data is received, the incoming signal is discarded and if audio data is received, the external peripheral device initiates a TCP/IP socket connection to the base unit through the communications network.

Attorney Docket No. BEEL3004C/TL

**REMARKS**

Examination of the application as amended is respectfully requested. No new matter is added by way of amendments.

Please charge any additional fees required or credit any overpayments in connection with this paper to Deposit Account No. 02-0200.

If any issues remain that may be resolved by a telephone or facsimile communication with the applicants' attorney, the examiner is invited to contact the undersigned at the numbers shown below.

Respectfully submitted,  
BACON & THOMAS, PLLC

/Thomas Lee/

---

THOMAS LEE  
Attorney for Applicant  
Registration No. 66,396

Dated: April 20, 2020

**Customer Number: 23364**  
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Attorney Docket No.: BEEL3004/TJM/TL

1/3

**DECLARATION & ASSIGNMENT  
(WITH APPLICATION DATA SHEET ONLY)**

**DECLARATION**

**TITLE OF INVENTION: ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS**

As the below named inventor, I hereby declare that:

This declaration is directed to:

- ☐ The accompanying utility or design patent application, or
- ☒ United States application number: 14/344,836 filed on March 13, 2014.

1. The above-identified application was made or authorized to be made by me.
2. I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.
3. I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

Direct all correspondence to the address associated with **Customer Number: 23364**.

***By signing this declaration, the inventor confirms that the application, including the claims, has been read and understood and that the inventor is aware of the duty to disclose to the U.S. Patent and Trademark Office all information known to the inventor to be material to patentability as defined in 37 CFR§1.56.***

**ASSIGNMENT**

WHEREAS, I, the below named inventor, hereinafter referred to as ASSIGNOR, is the or an owner of certain new and useful improvements in the above identified application (hereinafter referred to as the INVENTION).

WHEREAS, **BARCO N.V.**, whose post office address is/are Pres. Kennedypark 35, Kortrijk, Belgium B-8500,

hereinafter referred to as ASSIGNEE, is desirous of acquiring the entire right, title and interest in and to the INVENTION in the United States;

NOW, THEREFORE, for good and valuable consideration, receipt of which is hereby acknowledged, I, ASSIGNOR, by these presents do sell, assign and transfer unto said ASSIGNEE, the entire right, title, and interest in and to said INVENTION and application throughout the United States of America, including any and all Letters Patent granted on any division, continuation, continuation-in-part and reissue of said application.

Declaration/Assignment Short rev. 10OCT12  
Bacon & Thomas, PLLC

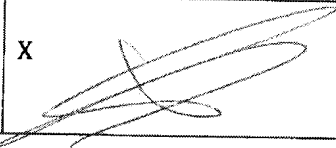
Attorney Docket No.: BEEL3004/TJM/TL


2/3

ALSO, ASSIGNOR hereby agrees to execute any documents that legally may be required in connection with the filing, prosecution and maintenance of said application or any other patent application(s) in the United States for said INVENTION, including additional documents that may be required to affirm the rights of ASSIGNEE in and to said INVENTION, all without further consideration. ASSIGNOR also agrees, without further consideration and at ASSIGNEE's expense, to identify and communicate to ASSIGNEE at ASSIGNEE'S request documents and information concerning the INVENTION that are within ASSIGNOR'S possession or control, and to provide further assurances and testimony on behalf of ASSIGNEE that lawfully may be required of ASSIGNOR in respect of the prosecution, maintenance and defense of any patent application or patent encompassed within the terms of this instrument. ASSIGNOR's obligations under this instrument shall extend to ASSIGNOR's heirs, executors, administrators and other legal representatives.

ALSO, ASSIGNOR hereby authorizes and requests the Commissioner of Patents and Trademarks to issue any and all Letters Patent referred to above to ASSIGNEE, as the ASSIGNEE of the entire right, title and interest in and to the same, for ASSIGNEE's sole use and behoof; and for the use and behoof of ASSIGNEE's legal representatives and successors, to the full end of the term for which such Letters Patent may be granted, as fully and entirely as the same would have been held by ASSIGNOR had this assignment and sale not been made.

ASSIGNOR authorizes any member of the firm of *Bacon & Thomas, PLLC* to insert or complete any information in the assignment portion of this document needed to effect its recordal in the U.S. Patent and Trademark Office.

LEGAL NAME OF INVENTOR/ASSIGNOR			
Name:	Koen Simon Herman BEEL	Date:	X 30/07/2015
Signature:	X 		


LEGAL NAME OF INVENTOR/ASSIGNOR			
Name:	Yoav NIR	Date:	X 23/02/2015
Signature:	X 		

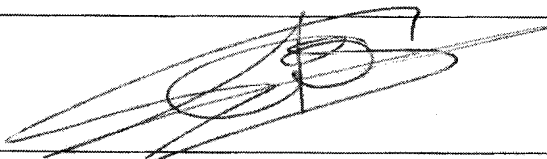
Declaration/Assignment Short rev. 10OCT12  
Bacon & Thomas, PLLC



Attorney Docket No.: BEEL3004/TJM/TL

3/3

LEGAL NAME OF INVENTOR/ASSIGNOR			
Name:	Filip Josephine Johan LOUWET	Date:	X 30/01/25
Signature:	X 		

LEGAL NAME OF INVENTOR/ASSIGNOR			
Name:	Guy COEN	Date:	X 30/01/25
Signature:	X 		

Declaration/Assignment Short rev. 10OCT12  
Bacon & Thomas, PLLC

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau(43) International Publication Date  
21 March 2013 (21.03.2013)(10) International Publication Number  
**WO 2013/037980 A2**(51) International Patent Classification:  
**H04N 7/15** (2006.01)(21) International Application Number:  
PCT/EP2012/068167(22) International Filing Date:  
14 September 2012 (14.09.2012)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
61/534,592 14 September 2011 (14.09.2011) US  
13/270,659 11 October 2011 (11.10.2011) US  
61/635,234 18 April 2012 (18.04.2012) US(71) Applicant (for all designated States except US): **BARCO**  
N.V. [BE/BE]; Pres. Kennedypark 35, B-Kortrijk 8500 (BE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **BEEL, Koen Simon**  
**Herman** [BE/BE]; Gemete 19, B-9080 Lochristi (BE).**NIR, Yoav** [BE/BE]; Lentedreef 21, B-8930 Rekkem (BE). **LOUWET, Filip Josephine Johan** [BE/BE]; Nieuwstraat 20, B-9910 Knesselare (BE). **COEN, Guy** [BE/BE]; Louis Camustra 25, B-9300 Aalst (BE).(74) Agent: **MICHALSKI HÜTTERMANN & PARTNER**;  
PATENTANWÄLTE, Neuer Zollhof 2, 40221 Düsseldorf (DE).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

[Continued on next page]

(54) Title: ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

(57) **Abstract:** An electronic meeting tool and method for communicating arbitrary media content from users at a meeting is described. These can include a node configuration means adapted to operate a display node of a communications network, the display node being coupled to a first display. The node configuration means is adapted to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display. At least one peripheral device adapted to communicate the user selected arbitrary media content via the communications network is provided, wherein the peripheral device is a connection unit comprising: (e) a connector adapted to couple to a port of a processing device having a second display, a memory and an operating system; and (f) a transmitter for communicating with the communications network. A program is provided that is adapted to be loaded onto the processing device and to run on the operating system of the processing device, said program being adapted to obtain user selected arbitrary media content, said program leaving a zero footprint on termination. An input device is provided to allow the user to carry out a user action that triggers transfer of said user selected arbitrary media content to said transmitter through said port.

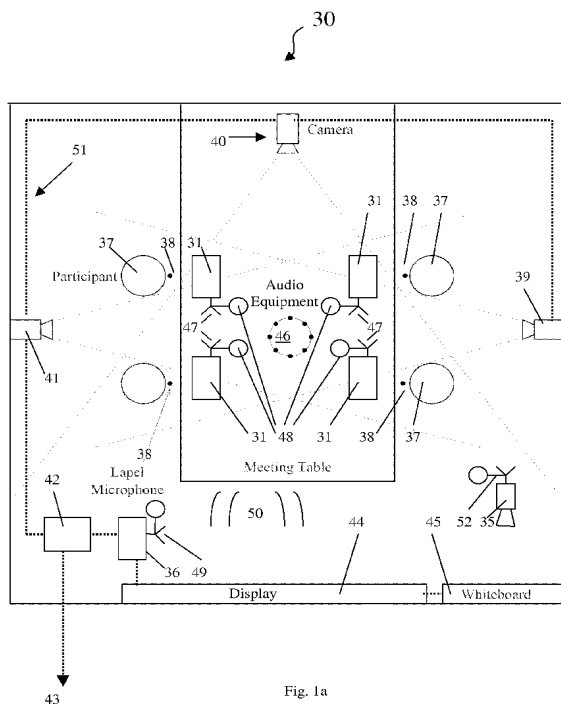


Fig. 1a

WO 2013/037980 A2

**WO 2013/037980 A2**

**(84) Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,

SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

**GENERAL POWER OF ATTORNEY BY APPLICANT**

This power revokes any previous powers of attorney given in the above-identified patent application.


I (we) hereby appoint Practitioners associated with the following Customer Number as my/our attorney, and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent):

**Customer Number: 23364**

Please recognize or change the correspondence address for the above-identified application to the address associated with the above-mentioned Customer Number.

I (we) am/are the Applicant Assignee or Person to Whom the Inventor is Under an Obligation to Assign. This revocation and appointment to the above-identified Practitioners is to the exclusion of the inventor(s).

Signature of Applicant for Patent

Signature			
Name	PETER GERETS	Date	11/02/2012
Title and Company	BARCO NV, VP Technology		

General Power of Attorney  
rev. 05NOV12  
Substitute for PTO/AIA/82B  
Bacon & Thomas, PLLC

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**Continuation Patent Application of:  
U.S. App. No. 14/344,836**

<b>Application No.:</b>	<b>TBD</b>	<b>Confirm. No.:</b>	<b>TBD</b>
<b>Filing Date:</b>	<b>April 20, 2020</b>	<b>Art Unit:</b>	<b>2184</b>
<b>First Inventor:</b>	<b>Koen Simon Herman BEEL</b>	<b>Customer No.:</b>	<b>23364</b>
<b>Attorney No.:</b>	<b>BEEL3004C/TL</b>	<b>Examiner:</b>	<b>TBD</b>
<b>For:</b>	<b>ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS</b>		

**INFORMATION DISCLOSURE STATEMENT**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

**INTRODUCTORY COMMENTS**

Pursuant to Rule 37 C.F.R. §§ 1.51(b), 1.56, 1.97 and 1.98, this Information Disclosure Statement is submitted in the above-identified patent application. A listing of documents to be published on the face of any patent granted from this application is submitted herewith on the attached form PTO/SB/08A. Any other documents or information submitted for consideration by the Examiner are listed on the attached forms. Copies of the references are not provided as they are of record in the parent Application Nos. 14/344,836 and 13/270,659 (*see* MPEP 609.02).

This Information Disclosure Statement is submitted before the mailing of a first Office action on the merits. No fees are required.

Atty. Dkt. No. BEEL3004C/TL

The Examiner is requested to acknowledge consideration of the information provided in this paper in accordance with prescribed procedures.

BACON & THOMAS, PLLC      Respectfully submitted,  
625 Slaters Lane, Fourth Floor  
Alexandria, Virginia 22314-1176      /Thomas Lee/  
Phone: (703) 683-0500

Date: April 20, 2020      THOMAS LEE  
Attorney for Applicant  
Registration No. 66,396

Doc code: IDS

PageID #: 3220

PTO/SB/08a (01-10)

Doc description: Information Disclosure Statement (IDS) Filed

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		2020-04-20
	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name		
	Attorney Docket Number	BEEL3004C/TL	

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Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	6966035	B1	2005-11-15	Suess et al.	Cited in Specification
	2	8316138	B2	2012-11-20	Chang	
	3	8346753	B2	2013-01-01	HAYES	

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	1	20100087139	A1	2010-04-08	Glass	Cited in Specification and German Search Report
	2	20060095376	A1	2006-05-04	Mitchell et al.	Cited in Specification
	3	20090198839	A1	2009-08-06	Banerjee et al.	Cited in Specification

Application Number  
PageID #: 3221**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	
Attorney Docket Number	BEEL3004C/TL

4	20110115689	A1	2011-05-19	Sugiyama et al.	Cited in Specification
5	20020196378	A1	2002-12-26	Slobodin et al.	Cited in Specification
6	20130067121	A1	2013-05-14	Beel et al.	Related U.S. App. 13/270,659
7	20130050254	A1	2013-02-28	Tran et al.	
8	20120331509	A1	2012-12-27	Laksono	
9	20070005809	A1	2007-01-04	Kobayashi et al.	
10	20100302130	A1	2010-12-02	Kikuchi et al.	
11	20070244970	A1	2007-10-18	Watanabe et al.	
12	20060031779	A1	2006-02-09	Theurer et al.	
13	20050036509	A1	2005-02-17	Acharya et al.	
14	20040263636	A1	2004-12-30	Cutler et al.	



Application Number  
PageID #: 3222**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	
Attorney Docket Number	BEEL3004C/TL

15	20090046139	A1	2009-02-19	Cutler et al.	
16	20110023096	A1	2011-01-27	XIAO et al.	
17	20070033289	A1	2007-02-08	NUYTTENS et al.	
18	20140082227	A1	2014-03-20	BEEL et al.	
19	20040125777	A1	2004-07-01	Doyle et al.	
20	20070065078	A1	2007-03-22	Jiang	
21	20090247006	A1	2009-10-01	Thompson	
22	20130054348	A1	2013-02-28	Holsman et al.	
23	20100302454	A1	2010-12-02	EPSTEIN et al.	
24	20090064302	A1	2009-03-05	COLELLA	
25	20130060662	A1	2013-03-07	CARLSON et al.	

Application Number  
PageID #: 3223**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	
Attorney Docket Number	BEEL3004C/TL

26	20110078716	A1	2011-03-31	MACWAN	
27	20100332663	A1	2010-12-30	CHANG	
28	20090235170	A1	2009-09-17	GOLDEN et al.	
29	20040128354	A1	2004-07-01	HORIKIRI et al.	corresponds to CN 1499841
30	20100066806	A1	2010-03-18	LYU	
31	20070109410	A1	2007-05-17	SIEW	
32	20110150433	A1	2011-06-23	ALEXANDROV et al.	
33	20110180380	A1	2011-07-28	Lee	
34	20020174254	A1	2002-11-21	KITA et al.	corresponds to CN 1689275

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Application Number  
PageID #: 3224**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	
Attorney Docket Number	BEEL3004C/TL

1	00/52887	WO	A1	2000-09-08	MICROSOFT CORPORATION		
2	1246395	EP	A1	2002-10-02	MOTOROLA, INC.		
3	1187480	EP	A1	2002-03-13	TELESUITE CORP.		
4	2001/089156	WO	A2	2001-11-22	SONY CORP		
5	2008/271265	JP	A	2008-11-06	MATSUSHITA ELECTRIC IND CO LTD	English abstract and translation	×
6	2107463	EP	A2	2009-10-07	OPTION		<input type="checkbox"/>
7	2756668	EP	A	2014-07-23	BARCO NV	corresponds to WO 2013/037979	<input type="checkbox"/>
8	1499841	CN	A	2004-05-26	FUJI XEIOX CO LTD	cited in CN OA, corresponds to US 20040128354	<input checked="" type="checkbox"/>
9	101106681	CN	A	2008-01-16	VTRON CORP	cited in CN OA, English machine translation	<input checked="" type="checkbox"/>
10	1788494	CN	A	2006-06-14	TELESUIT CORP	cited in CN OA, English abstract	<input checked="" type="checkbox"/>
11	101022529	CN	A	2007-08-22	LIXING INTERNAT SCIENCE & TECH	cited in CN OA, English abstract	<input checked="" type="checkbox"/>

Application Number  
PageID #: 3225**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	
Attorney Docket Number	BEEL3004C/TL

12	101106469	CN	A	2008-01-16	AWIND INC	cited in CN OA, English abstract	<input checked="" type="checkbox"/>
13	101442500	CN	A	2009-05-27	XIAOTAO YIN	cited in CN OA, English abstract	<input checked="" type="checkbox"/>
14	101828392	CN	A	2010-09-08	CREATIVE TECH LTD	cited in CN OA, English abstract	<input checked="" type="checkbox"/>
15	102023852	CN	A	2011-04-20	JULONG EDUCATIONAL TECHNOLOGY CO LTD	cited in CN OA, English abstract	<input checked="" type="checkbox"/>
16	1689275	CN	A	2005-10-26	SONY CORP	English abstract, corresponds to US 20020174254	<input checked="" type="checkbox"/>
17	2007/137415	WO	A1	2007-12-06	SMART TECH INC	cited in EP Office Communication	<input type="checkbox"/>

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>
	1	International Search Report (ISR) dated March 6, 2013, for PCT/EP2012/068166.	
	2	International Search Report (ISR) dated March 19, 2013, for PCT/EP2012/068167.	
	3	International Search Report (ISR) dated March 4, 2013, for PCT/EP2012/068168.	

Application Number  
PageID #: 3226**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	
Attorney Docket Number	BEEL3004C/TL

4	International Search Report (ISR) dated January 28, 2013, for PCT/EP2012/068169.	
5	British Search Report dated August 28, 2012, for GB 1206841.7.	
6	German Search Report dated November 17, 2011, for DE 102011055443.2.	
7	Jiang et al., "A Novel Wireless Approach for Conference Projecting and Cooperating", Lecture Notes in Computer Science, Vol. 4159, pp. 688-697, 2006. (cited in GB 1206841.7 Search Report)	
8	Martin Trautschold, iPhone 4 Made Simple, 2010, Apress, Pages 1-819.	
9	Office Action in related U.S. Application Number 15/449,048, dated February 16, 2018.	
10	US Office Action dated March 29, 2016, for 14/395,364.	
11	Marc AL-HAMES et al., Audio-Visual Processing in Meetings: Seven Questions and Current AMI Answers, 2006.	
12	Mood indicators on electronic meeting tools" IBM, IP.com number: IPCOMOOOO1171D, Publication Date: March 12, 2003.	
13	Final Office Action in related U.S. Application No. 14/278,442, dated June 8, 2018.	
14	Office Action in related Chinese Application Number 201280055744.2, dated March 30, 2018.	×

**INFORMATION DISCLOSURE  
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Application Number		PageID #: 3227
Filing Date		2020-04-20
First Named Inventor	Koen Simon Herman BEEL	
Art Unit	2184	
Examiner Name		
Attorney Docket Number	BEEL3004C/TL	

15	Office Action in related U.S. Application Number 14/344,836, dated February 28, 2018.	<input type="checkbox"/>
16	U.S. Office Action dated October 20, 2017, for U.S. Application No. 14/344,836.	<input type="checkbox"/>
17	European Notice of Opposition dated September 27, 2017 for EP 2756668.	<input type="checkbox"/>
18	StarTech.com: USB to DVI External Dual Monitor Video Adapter/USB to VGA External Dual Monitor Video Adapter, User Manual dated May 19, 2011.	<input type="checkbox"/>
19	Microsoft Community, conversation on August 30, 2011 about USB2VGA Adapter, retrieved on September 7, 2017.	<input type="checkbox"/>
20	Webopedia Definition of Peripheral Device, retrieved on September 7, 2017.	<input type="checkbox"/>
21	Trulink Wireless USB2VGA Adapter, Quick Start Guide, retrieved from www.c2g.com.	<input type="checkbox"/>
22	WebPage on Availability of Trulink, retrieved on September 7, 2017.	<input type="checkbox"/>
23	Chinese Office Action dated October 31, 2017, for CN 201280001542.X, and English translation thereof.	<input type="checkbox"/>
24	European Office Communication dated June 15, 2015, for EP 12762258.7.	<input type="checkbox"/>
25	European Office Action dated August 1, 2016, for EP 12762258.7.	<input type="checkbox"/>

Application Number  
PageID #: 3228**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

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First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	
Attorney Docket Number	BEEL3004C/TL

26	J.S. Office Action dated June 17, 2016, for 14/278,442.	<input type="checkbox"/>
27	J.S. Office Action dated June 17, 2016, for 14/725,401.	<input type="checkbox"/>
28	Chinese Office Action dated April 5, 2017, for CN 201280055744.2, and English translation thereof.	<input type="checkbox"/>
29	J.S. Office Action dated May 3, 2017, for U.S. Application No. 14/344,836.	<input type="checkbox"/>
30	Chinese Office Action dated September 26, 2017, for CN 201280055744.2, and English translation thereof.	<input checked="" type="checkbox"/>
31	J.S. Office Action dated September 28, 2017, for U.S. Application No. 14/278,442.	<input type="checkbox"/>
32	"Quick Connect Wireless with Epson Projectors", retrieved from <a href="https://www.youtube.com/watch?v=9POz4-HyDXY">https://www.youtube.com/watch?v=9POz4-HyDXY</a> , November 3, 2009.	<input type="checkbox"/>
33	"Remote Framebuffer Protocol (RFB)", Internet standard IETF RFC 6143 , March 2011.	<input type="checkbox"/>
34	Richardson & Wood, "The RFB Protocol", Cambridge: ORL, 1998.	<input type="checkbox"/>
35	"Manual of the Epson projectors", retrieved from <a href="http://esupport.epson europe.com/ViewArticle.aspx?lng=sv-SE&amp;kbid=328038&amp;data=bOU002FRIfu7YFtMOBp2mpSKntPq1A26Wyyw&amp;cl=1">http://esupport.epson europe.com/ViewArticle.aspx?lng=sv-SE&amp;kbid=328038&amp;data=bOU002FRIfu7YFtMOBp2mpSKntPq1A26Wyyw&amp;cl=1</a> , February 14, 2011.	<input type="checkbox"/>
36	Chinese Office Action dated December 27, 2016, for CN 201280074077.2, and English translation thereof.	<input type="checkbox"/>

Application Number  
PageID #: 3229**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	
Attorney Docket Number	BEEL3004C/TL

37	Final Office Action in corresponding U.S. App. 14/725,401 dated January 26, 2017.	<input type="checkbox"/>
38	Final Office Action in corresponding U.S. App. 14/278,442 dated January 26, 2017.	<input type="checkbox"/>
39	Chinese Office Action in Chinese Application Number 201280074077.2, dated January 4, 2018.	<input checked="" type="checkbox"/>
40	International Preliminary Report on Patentability (IPRP) dated March 27, 2014, for PCT/EP2012/068166.	<input type="checkbox"/>
41	International Preliminary Report on Patentability (IPRP) dated March 27, 2014, for PCT/EP2012/068167.	<input type="checkbox"/>
42	International Preliminary Report on Patentability (IPRP) dated March 27, 2014, for PCT/EP2012/068168.	<input type="checkbox"/>
43	Request for Reexamination of Patent No. 8,756,348, dated February 9, 2018.	<input type="checkbox"/>
44	Request for Reexamination of Patent No. 9,083,769, dated February 9, 2018.	<input type="checkbox"/>
45	Intervention according to Art. 105 EPC in corresponding European patent 2756668, dated May 3, 2018.	<input type="checkbox"/>
46	Chinese Office Action dated November 4, 2016, for CN 201280001542.X, and English translation thereof.	<input type="checkbox"/>
47	European Office Communication dated December 21, 2015, for EP 12762258.7.	<input type="checkbox"/>



Application Number  
PageID #: 3230**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	
Attorney Docket Number	BEEL3004C/TL

48	Chinese Office Action dated June 28, 2017, for CN 201280074077.2, and English translation thereof.	<input checked="" type="checkbox"/>
49	Chinese Office Action dated July 4, 2017, for CN 201280055667.0, and English translation thereof.	<input checked="" type="checkbox"/>
50	Chinese Office Action dated July 21, 2017, for CN 20128001542.X, and English translation thereof.	<input checked="" type="checkbox"/>

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	Filing Date		2020-04-20
	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
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	Attorney Docket Number	BEEL3004C/TL	

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The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

### SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2020-04-20
Name/Print	THOMAS LEE	Registration Number	66396

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Application Number

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

TBD

Attorney Docket Number

BEEL3004CTL

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	1	6601087		2003-07-29	Zhu et al.	
	2	7584313		2009-09-01	Hay et al.	
	3	7762470		2010-07-27	Finn et al.	
	4	8069465		2011-11-29	Bartholomay et al.	
	5	8327410		2012-12-04	Andersen et al.	
	6	8521926		2013-08-27	Hsueh et al.	
	7	8601470		2013-12-03	Yue et al.	
	8	8717599		2014-05-06	Ochiai et al.	

Application Number  
PageID #: 3234**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	TBD
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9	8896656	2014-11-25	Epstein et al.
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	1	20030120849		2003-06-26	Roslak et al.	
	2	20060233191		2006-10-19	Pirzada et al.	
	3	20070162661		2007-07-12	Fu et al.	
	4	20080088634		2008-04-17	Thompson et al.	
	5	20080182518		2008-07-31	Lo	
	6	20090023475		2009-01-22	Chang et al.	
	7	20090029647		2009-01-29	Wei et al.	
	8	20090251621		2009-10-08	Ichieda	

Application Number  
PageID #: 3235**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	TBD
Attorney Docket Number	BEEL3004CTL

9	20100022274	2010-01-28	Roberts et al.
10	20100077021	2010-03-25	Hsueh et al.
11	20100091987	2010-04-15	Takahashi et al.
12	20100115145	2010-05-06	Banerjee et al.
13	20100154014	2010-06-17	Andersen et al.
14	20100297964	2010-11-25	Austin et al.
15	20100309896	2010-12-09	Sugiyama et al.
16	20110010470	2011-01-13	Hulbert et al.
17	20110010607	2011-01-13	Raveendran
18	20110038005	2011-02-17	Ochiai et al.
19	20110210983	2011-09-01	Theimer et al.

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First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	TBD
Attorney Docket Number	BEEL3004CTL

20	20110179182	A1	2011-07-21	VADLA RAVNAS
21	20050015719	A1	2005-01-20	MARCHON et al.
22	20090092198	A1	2011-04-21	Miyata
23	20050122392	A1	2005-06-09	Johansen et al.
24	20090300520	A1	2009-12-03	Ashutosh et al.
25	20120054372		2012-03-01	Chen et al.
26	20090189981		2009-07-30	Siann et al.
27	20110188391		2011-08-04	Sella et al.
28	20100064063		2010-03-11	Deforche et al.
29	20110092198		2011-04-21	Miyata

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Art Unit	2184
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Attorney Docket Number	BEEL3004CTL

Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1	2006-185359	JP		2006-07-13	Eastman Kodak Co.	English Abstract	
	2	2009-080663	JP		2009-04-16	Brother Ind Ltd.	English Abstract	
	3	2010-263326	JP		2010-11-18	Sumitomo Electric Ind.	English Abstract	
	4	2010/008866	WO		2010-01-21	Schaaf		
	5	2008-090561	JP		2008-04-17	BROTHER IND LTD	cited in EP Search Report, English abstract & mach translation	
	6	1329055	EP		2003-07-23	SONY CORP	cited in EP Search Report, corresponds to WO 01/089156	
	7	1476242	CN		2004-02-18	SEIKO EPSON CORP	English abstract of corresponding EP 1385336, cited in CN OA	
	8	2010/105335	WO		2010-09-23	SMART TECHNOLOGIES ULC	cited in CN OA	
	9	102045864	CN		2011-05-04	NEC CASIO MOBILE COMM LTD	English abstract (Corresponds U.S. 2011/0092198), cited in CN OA	
	10	101631223	CN		2011-04-20	SHANGHAI HUAPING INFORMATION TECHNOLOGY CO LTD	Cited in CN OA dated 10-10-16, English abstract	



Application Number  
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Art Unit	2184
Examiner Name	TBD
Attorney Docket Number	BEEL3004CTL

11	101454762	CN		2013-06-12	SMART TECHNOLOGIES ULC	Cited in CN OA dated 10-10-16, English abstract	
12	1550996	CN		2004-12-01	SEIKO EPSON CORP	Cited in CN OA dated 10-14-16, English abstract	
13	101965609	CN		2011-02-02	SMART TECHNOLOGIES ULC	Cited in CN OA dated 10-14-16, English abstract	
14	1385336	EP		2004-01-28	SEIKO EPSON CORP		
15	2013037979	WO		2013-03-21	Barco N.V.		
16	2008165007	JP		2008-07-17	Brother Ind Ltd		×
17	2000242257	JP		2000-09-08	Canon KK		☒
18	102045864	CN		2011-05-04	NEC Casio Mobile Comm Ltd.	English abstract	☐
19	2010135894	WO	A1	2010-12-02	ZTE Corporation	English Abstract.	☒

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>
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Application Number  
PageID #: 3239**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	TBD
Attorney Docket Number	BEEL3004CTL

1	"Universal Serial Bus 3.0 Specification", Revision 1.0 Nov. 12, 2008.
2	"Wireless Universal Serial Bus Specification 1.1", Revision 1.1 September 9, 2010.
3	AUSTIN et al., "Determinants and Patterns of Control over Technology in a Computerized Meeting Room," CSCW 90 Proceedings, pp. 39-51 (Oct. 1990).
4	ROTH, "Building Group Decision Support Rooms Using 'Off-the-Shelf' Computing Resources: Prospects and Issues," Database, pp. 21-31 (May 1993).
5	GRAY, et al., "The User Interface in Group Decision Support Systems," Group Support Systems: New Perspectives, Ch. 10, Macmillan Publishing Company, New York (1993).
6	Products, components, systems, and methods in public use and/or sale related to the Epson Quick Wireless Connection USB key and Quick Wireless Connection , developed by Epson (accessed July 7, 2017)
7	Products, components, systems, and methods in public use and/or sale related to the IOGEAR GUW2015VKIT Wireless USB to VGA Adapter Kit, developed by IOGEAR (accessed July 17, 2017).
8	Products, components, systems, and methods in public use and/or sale related to the ActionTec MyWirelessTV HDMI Transmitter, developed by ActionTec and Cavium (accessed Feb. 3, 2020).
9	European Search Report dated August 1, 2017, for EP 16207123.
10	European Extended Search Report dated November 3, 2016, for EP 16170760.9.
11	Chinese Office Action dated October 14, 2016, for CN 201280055744.2.

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STATEMENT BY APPLICANT**  
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12	Chinese Office Action dated October 10, 2016, for CN 201280055667.0.	
13	Final Office Action in corresponding U.S. app. 14/395,364 dated November 2, 2016.	
14	Office Action in related U.S. app. 14/725,401 dated December 31, 2019.	
15	Summons to attend oral proceedings in corresponding EP 12762258.7 dated December 12, 2019.	
16	Chinese Office Action in corresponding Chinese Application No. 201280074077.2, dated September 30, 2019.	
17	U.S. Office Action in corresponding U.S. Application No. 14/278,442, dated September 18, 2019.	
18	Notice on Reexamination in corresponding Chinese Application No. 201280001542.X, dated June 11, 2019.	×
19	European Office Action in corresponding European Application No. 12759440.6-1204, dated May 28, 2019.	<input type="checkbox"/>
20	U.S. Office Action in corresponding U.S. Application No. 15/449,048, dated April 8, 2019.	<input type="checkbox"/>
21	European Office Action in corresponding European Application No. 12775162.6-1204, dated May 21, 2019.	<input type="checkbox"/>
22	Chinese Office Action in corresponding Chinese Application No. 201280074077.2, dated March 5, 2019.	<input type="checkbox"/>

Application Number  
PageID #: 3241**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	TBD
Attorney Docket Number	BEEL3004CTL

23	European Office Action in corresponding European Application No. 16170760.9-1216, dated April 2, 2019.	<input type="checkbox"/>
24	Non-Final Office Action in corresponding U.S. Reexamination No. 90/014,088, dated September 25, 2018.	<input type="checkbox"/>
25	Final Office Action in corresponding U.S. Reexamination No. 90/014,087, dated January 22, 2019.	<input type="checkbox"/>
26	Chinese Office Action in related Chinese Application No. 201280001542.X, dated January 2, 2019.	<input checked="" type="checkbox"/>
27	<a href="https://www.infocus.com/resources/documents/User-Guides/Liteshow-3-UserGuide.pdf">https://www.infocus.com/resources/documents/User-Guides/Liteshow-3-UserGuide.pdf</a> , accessed October 3, 2018.	<input type="checkbox"/>
28	<a href="http://esupport.epson-europe.com/ViewArticle.aspx?lng=sv-SE&amp;kbid=328038&amp;data=bOU002FRIfu7YFtMOBp2mpSKntPq1A26Wyyw&amp;cl=1">http://esupport.epson-europe.com/ViewArticle.aspx?lng=sv-SE&amp;kbid=328038&amp;data=bOU002FRIfu7YFtMOBp2mpSKntPq1A26Wyyw&amp;cl=1</a> , accessed July 8, 2017.	<input type="checkbox"/>
29	SIPO Office Action in corresponding app. CN 201280074077.2 dated August 23, 2018.	<input checked="" type="checkbox"/>
30	Office Action in corresponding app. 15/449,048 dated October 12, 2018.	<input type="checkbox"/>
31	SIPO Office Action in corresponding app. CN 201280001542.X dated July 30, 2018.	<input checked="" type="checkbox"/>
32	EPO Office Action in corresponding app. EP 12759440.6-1204 dated August 9, 2018.	<input type="checkbox"/>
33	EPO Office Action in corresponding app. EP 12775162.6-1204 dated August 9, 2018.	<input type="checkbox"/>

Application Number  
PageID #: 3242**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	TBD
Attorney Docket Number	BEEL3004CTL

34	Office Action in corresponding app. 14/725,401 dated September 10, 2018.	<input type="checkbox"/>
35	Office Action in corresponding app. 90/014,087 dated September 4, 2018.	<input type="checkbox"/>
36	Office Action in corresponding app. 16/034,846 dated October 7, 2019.	<input type="checkbox"/>
37	Office Action in corresponding app. 14/344,830 dated September 27, 2017.	<input type="checkbox"/>
38	Office Action in corresponding app. 14/344,830 dated October 6, 2016.	<input type="checkbox"/>
39	Chinese Notice on Reexamination in corresponding Chinese Application No. 201280074077.2, dated March 31, 2020.	<input checked="" type="checkbox"/>
40	European Office Action in corresponding European Application No. 12775162.6, dated April 14, 2020.	<input type="checkbox"/>
41	Brazil Office Action in corresponding Brazil Application No. BR112014026147-4, dated April 8, 2020.	<input checked="" type="checkbox"/>
42	Brazil Office Action in corresponding Brazil Application No. BR122015022158-7, dated April 8, 2020.	<input checked="" type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button **EXAMINER SIGNATURE**

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Application Number  
PageID #: 3243**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	TBD
Attorney Docket Number	BEEL3004CTL

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		PageID #: 3244
	Filing Date		2020-04-20
	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name	TBD	
	Attorney Docket Number	BEEL3004CTL	

### CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

### SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2020-04-20
Name/Print	THOMAS LEE	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

## Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



**Electronic Patent Application Fee Transmittal**

<b>Application Number:</b>				
<b>Filing Date:</b>				
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS			
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman BEEL			
<b>Filer:</b>	Thomas Lee/Shelly Darrenkamp			
<b>Attorney Docket Number:</b>	BEEL3004C/TL			
Filed as Large Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
UTILITY APPLICATION FILING	1011	1	300	300
UTILITY SEARCH FEE	1111	1	660	660
UTILITY EXAMINATION FEE	1311	1	760	760
<b>Pages:</b>				
<b>Claims:</b>				
INDEPENDENT CLAIMS IN EXCESS OF 3	1201	1	460	460
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				2180

**Electronic Acknowledgement Receipt**

<b>EFS ID:</b>	39200129
<b>Application Number:</b>	16852790
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5321
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman BEEL
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas Lee
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	BEEL3004C/TL
<b>Receipt Date:</b>	20-APR-2020
<b>Filing Date:</b>	
<b>Time Stamp:</b>	13:23:36
<b>Application Type:</b>	Utility under 35 USC 111(a)

**Payment information:**

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$2180
RAM confirmation Number	E20204JD25137959
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	BEEL3004C_Utility_trans.pdf	291826	no	2
			8f07332feb3b3baa19155c51c1cf0e517f99dd71		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	BEEL3004C_Fee_Transmittal.pdf	235818	no	2
			f2625ffc05756fa3fc56da66398d860e4f6cf57		
Warnings:					
Information:					
3	Application Data Sheet	BEEL3004C_ADS.pdf	1256701	no	10
			5e4b1842d4bbb04f2e9e416310294c3c76e0a44b		
Warnings:					
Information:					
4		BEEL3004_pct_publication.pdf	3853839	yes	74
			522aa8840d031b32dff6daafb7c2eb5f75d3b559		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Abstract		1	2	
	Specification		3	55	
	Claims		56	68	
	Drawings-only black and white line drawings		69	74	
Warnings:					
Information:					

Case 2:23-cv-00521-JRG-RSP Document 71-10 Filed 01/28/25 Page 135 of 1328

5		BEEL3004C_PrelimAmend.pdf	54702  2bad380b45100866ecc4d762c5533cd1955761db	yes	9
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Preliminary Amendment		1	1	
	Abstract		2	3	
	Specification		4	4	
	Claims		5	8	
	Applicant Arguments/Remarks Made in an Amendment		9	9	
Warnings:					
Information:					
6	Oath or Declaration filed	BEEL3004_Dec_Assgn.pdf	385883  aafd52da2e4aa574259d4ec876621b19d7374cc6	no	3
Warnings:					
Information:					
7	Power of Attorney	GENERAL_POA_BARCO.pdf	158558  28c4f1a66fb792dec0424ac70f226a829279744a	no	1
Warnings:					
Information:					
8	Transmittal Letter	BEEL3004C_IDS_Transmittal_Ltr.pdf	26073  041810f5b532f932d1113e558cc3b5c3cd3b1952	no	2
Warnings:					
Information:					
9	Information Disclosure Statement (IDS) Form (SB08)	BEEL3004C_IDS_SB08_Part1.pdf	616252  a62a7d2a3d03157f3771320a3aeeba10fd5bdf2	no	13
Warnings:					
Information:					

10	Information Disclosure Statement (IDS) Form (SB08)	BEEL3004C_ids_Sb08_part2. pdf	1038097  cb47aaa576c52052be7abc6d89dd7a7a2a7 57542	no	13
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**Warnings:****Information:**

11	Fee Worksheet (SB06)	fee-info.pdf	36689  b97fad66f64d9777aa4edb850dc3bb0593 834ae	no	2
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**Warnings:****Information:**

<b>Total Files Size (in bytes):</b>			7954438
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**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b>						Application or Docket Number 16/852,790				
Substitute for Form PTO-875										
<b>APPLICATION AS FILED - PART I</b>										
(Column 1)		(Column 2)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY				
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)				RATE(\$)	FEE(\$)	
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A					N/A	300	
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A					N/A	660	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A					N/A	760	
TOTAL CLAIMS (37 CFR 1.16(j))	20	minus 20 = *			OR			x 100 =	0.00	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4	minus 3 = *	1					x 460 =	460	
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								0.00	
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))									0.00	
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL		TOTAL			2180	
<b>APPLICATION AS AMENDED - PART II</b>										
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY		
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)			RATE(\$)	ADDITIONAL FEE(\$)	
	Total (37 CFR 1.16(i))	*	Minus **	=	x	=	OR		x	=
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x	=	OR		x	=
	Application Size Fee (37 CFR 1.16(s))						OR			
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						OR			
				TOTAL ADD'L FEE		OR		TOTAL ADD'L FEE		
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)			RATE(\$)	ADDITIONAL FEE(\$)	
	Total (37 CFR 1.16(i))	*	Minus **	=	x	=	OR		x	=
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x	=	OR		x	=
	Application Size Fee (37 CFR 1.16(s))						OR			
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						OR			
				TOTAL ADD'L FEE		OR		TOTAL ADD'L FEE		
<p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.</p> <p>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".</p> <p>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".</p> <p>The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.</p>										



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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
16/852,790	04/20/2020	2676	2180	BEEL3004C/TL	20	4

CONFIRMATION NO. 5321

FILING RECEIPT

23364  
BACON & THOMAS, PLLC  
625 SLATERS LANE  
FOURTH FLOOR  
ALEXANDRIA, VA 22314-1176



Date Mailed: 04/27/2020

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

**Please verify the accuracy of the data presented on this receipt.** If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

**Inventor(s)**

Koen Simon Herman Beel, Eke, BELGIUM;  
Yoav Nir, Komen, BELGIUM;  
Filip Josephine Johan Louwet, Knesselare, BELGIUM;  
Guy Coen, Aalst, BELGIUM;

**Applicant(s)**

BARCO N.V., Kortrijk, BELGIUM;

**Assignment For Published Patent Application**

BARCO N.V., Kortrijk, BELGIUM

**Power of Attorney:** The patent practitioners associated with Customer Number 23364

**Domestic Priority data as claimed by applicant**

This application is a CON of 14/344,836 03/03/2015  
which is a 371 of PCT/EP2012/068167 09/14/2012  
which claims benefit of 61/534,592 09/14/2011  
and claims benefit of 61/635,234 04/18/2012  
and is a CIP of 13/270,659 10/11/2011 PAT 8756348

**Foreign Applications** for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

*Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.*



**Permission to Access Application via Priority Document Exchange:** Yes

**Permission to Access Search Results:** Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

**If Required, Foreign Filing License Granted:** 04/23/2020

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/852,790**

**Projected Publication Date:** 08/06/2020

**Non-Publication Request:** No

**Early Publication Request:** No

**Title**

ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

**Preliminary Class**

358

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

## **PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES**

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

## **LICENSE FOR FOREIGN FILING UNDER**

### **Title 35, United States Code, Section 184**

### **Title 37, Code of Federal Regulations, 5.11 & 5.15**

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Doc code: IDS

PageID #: 3257

PTO/SB/08a (01-10)

Doc description: Information Disclosure Statement (IDS) Filed

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	16852790
	Filing Date	2020-04-20
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	BARTELS, CHRISTOPHER A.
	Attorney Docket Number	BEEL3004C/TL

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Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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	1	20020054044	A1	2002-05-09	Lu et al.	

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		16852790
	Filing Date		2020-04-20
	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name	BARTELS, CHRISTOPHER A.	
	Attorney Docket Number	BEEL3004C/TL	

1	LINQ SOFTWARE USER'S GUIDE, Smart Technologies Inc., Copyright 2004-2005, Version 1.0, pages 1-19.	
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<small> <sup>1</sup> See Kind Codes of USPTO Patent Documents at <a href="http://www.USPTO.GOV">www.USPTO.GOV</a> or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.         </small>		

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	16852790
	Filing Date	2020-04-20
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	BARTELS, CHRISTOPHER A.
	Attorney Docket Number	BEEL3004C/TL

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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

### SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2020-06-16
Name/Print	THOMAS LEE	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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<b>EFS ID:</b>	39728220
<b>Application Number:</b>	16852790
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5321
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas Lee/Shelly Darrenkamp
<b>Filer Authorized By:</b>	Thomas Lee
<b>Attorney Docket Number:</b>	BEEL3004C/TL
<b>Receipt Date:</b>	16-JUN-2020
<b>Filing Date:</b>	20-APR-2020
<b>Time Stamp:</b>	11:41:49
<b>Application Type:</b>	Utility under 35 USC 111(a)

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**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	BEEL3004C_IDS.pdf	612267 13f9c97666f897b45d838e7d0bf3aa1b3f7fcd2	no	4

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2	Non Patent Literature	LinQ_Software_Users_Guide. pdf	2532188  5ecd1dab1c60cf631ea7f88a95907d0a9a3c8107	no	19
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Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

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**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	BARTELS, CHRISTOPHER A.
Attorney Docket Number	BEEL3004C/TL

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		16852790
	Filing Date		2020-04-20
	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name	BARTELS, CHRISTOPHER A.	
	Attorney Docket Number	BEEL3004C/TL	

1	U.S. Office Action in corresponding U.S. Application No. 16/034,846, dated June 25, 2020.
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Examiner Signature		Date Considered	
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<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		16852790
	Filing Date		2020-04-20
	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name	BARTELS, CHRISTOPHER A.	
	Attorney Docket Number	BEEL3004C/TL	

### CERTIFICATION STATEMENT

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**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

### SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2020-06-30
Name/Print	THOMAS LEE	Registration Number	66396

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
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**Electronic Acknowledgement Receipt**

<b>EFS ID:</b>	39870934
<b>Application Number:</b>	16852790
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5321
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas Lee/Shelly Darrenkamp
<b>Filer Authorized By:</b>	Thomas Lee
<b>Attorney Docket Number:</b>	BEEL3004C/TL
<b>Receipt Date:</b>	30-JUN-2020
<b>Filing Date:</b>	20-APR-2020
<b>Time Stamp:</b>	14:41:48
<b>Application Type:</b>	Utility under 35 USC 111(a)

**Payment information:**

Submitted with Payment	no
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**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	BEEL3004C_IDS.pdf	612128	no	4
			819c012b06d5b48e3d3d231ab6a8fef02de75381		

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2	Non Patent Literature	FOA_25Jun2020.pdf	1812380	no	44
			2c324aa25c019b2ee3bcfe4688b48a5197d22ac8		

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2424508

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**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/852,790	04/20/2020	Koen Simon Herman Beel	BEEL3004C/TL

**CONFIRMATION NO. 5321**

**PUBLICATION NOTICE**



\*OC000000119014933\*

23364  
BACON & THOMAS, PLLC  
625 SLATERS LANE  
FOURTH FLOOR  
ALEXANDRIA, VA 22314-1176

**Title:**ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

**Publication No.**US-2020-0250110-A1

**Publication Date:**08/06/2020

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	Filing Date	2020-04-20
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	Bartels, Christopher A.
	Attorney Docket Number	BEEL3004C/TL

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	1	1525300	CN	A	2004-09-01	Microsoft Corp.	Abstract.	×

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2	1555197	CN	A	2004-12-15	Shenzhen Postgraduate Inst Tsi	Abstract.	<input checked="" type="checkbox"/>
3	101046952	CN	A	2007-10-03	Kei Nakayama	Abstract.	<input checked="" type="checkbox"/>
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2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

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Examiner Name	Bartels, Christopher A.
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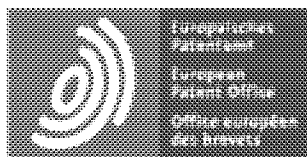
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CN1525300A System and method for real-time whiteboard streaming

Applicants: MICROSOFT CORP [US]

Inventors: HE LI-WEI,ZHANG ZHENGYOU

Classifications:

IPC **G06T1/00; G06T5/00; G06T5/20; H04L29/06; H04N7/15;** (IPC1-7): G06F3/033;CPC **A01K61/10 (KR); E02B3/14 (KR); H04L29/06027 (EP); H04L65/4046 (EP);  
H04L67/38 (EP); H04N7/15 (EP);**

Priorities: US44968303P 2003-02-24; US46306803A 2003-06-17

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Publication: CN1525300A·2004-09-01

Published as: **CN1324444C; CN1525300A;EP1460851A2; EP1460851A3; JP2004260823A; JP4482348B2;  
KR100995218B1; KR20040076216A; US2004165768A1; US7224847B2**

System and method for real-time whiteboard streaming

Abstract

A is used for the technology of using flowing in the network environment conveying the content of the white board to system and method of the computational unit. This invention is that one kind produces technical expansion to white board picture, in order to offer the based on network goal meeting to cooperate. In one embodiment of this invention, each network customer can receive audio frequency content and white board content (video image). In another embodiment, each networks the customer and sends content of the audio frequency and note content, content of this note reveals alone that on the white board picture, or is produced from the real white board. The technological content flows in this to set up and cooperate on the outside on the framework.

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1.一种用于创建增强白板内容的数据流的计算机可执行处理，包括下述处理动作：

输入白板图像帧序列；

将每个所述白板的所述图像帧分成各个单元；

判断在所述图像序列中的所述单元内是否存在显著的光照变化；

如果存在显著的光照变化，就执行白板颜色匹配处理以判定白板的颜色是否反映了在白板颜色模型数据库中的一种白板颜色，所述白板颜色用于定义白板背景颜色；

如果不存在显著光照变化，就将图像帧的每个单元分成前景、白板背景或写在白板上的内容的笔划单元；

对所述图像帧序列进行增强，以便在白板上的笔划能以使用所述单元分类的增强形式显示；以及

以数据流形式输出所述白板增强图像帧的序列。

2.如权利要求 1 所述的计算机可执行处理，其特征在于，所述增强图像帧序列以便白板上的笔划可以以增强形式显示的处理动作还包括下述处理动作：

使得在所述图像帧序列中显示白板背景的单元的白板背景颜色更加统一；

减少所述图像帧序列中的图像噪声；以及

增加白板内容笔划的饱和度，以使得所述笔划对于笔划单元来说更加鲜明易读。

3.如权利要求 1 所述的计算机可执行处理，其特征在于，所述以数据流形式输出所述白板增强图像帧的序列的处理动作包括仅使用增强白板单元和增强笔划单元而不使用前景单元。

4.如权利要求 1 所述的计算机可执行处理，其特征在于，所述以数据流形式输出所述白板增强图像帧的序列的处理动作包括使用增强白板单元、增强笔划单元和前景单元。

5. 如权利要求 1 所述的计算机可执行处理，其特征在于，所述白板颜色



匹配处理动作包括：

确定在新亮度条件中的白板背景单元的颜色是否与白板颜色模型数据库中的一种白板颜色模型匹配：

如果在新亮度条件中的白板背景单元的颜色与反映所述白板颜色模型数据库中的白板背景单元颜色的白板颜色模型相对应，将这种白板颜色模型用于后续单元分类中；

如果在新亮度条件中的白板背景单元的颜色没有在所述白板颜色模型数据库中找到，就创建新白板颜色模型以反映在新亮度条件中的白板背景单元的颜色。

6. 如权利要求 5 所述的计算机可执行处理，其特征在于，进一步包括下述处理动作：

将所述新白板颜色模型添加到白板颜色模型数据库中。

7. 如权利要求 1 所述的计算机可执行处理，其特征在于，进一步包括确定笔划是否被加入白板或从白板中去除的处理动作。

8. 如权利要求 7 所述的计算机可执行处理，其特征在于，所述确定笔划是否加入或去除的处理动作包括通过与所述图像帧序列中对应的位置的单元相比较来确定每个单元中的笔划内容是否增加和减少了。

9. 如权利要求 7 所述的计算机可执行处理，其特征在于，进一步包括如果在所述单元中存在变化就通过仅显示增强笔划单元和增强白板背景而不显示前景单元来向所述增强图像序列输出单元。

10. 如权利要求 9 所述的计算机可执行处理，其特征在于，直到确定已经添加或去除了笔划，才将增强白板和增强笔划单元输出到增强图像序列中，并且其中当出现笔划内容变化时，就输出对应于添加或去除的笔划的增强笔划单元。

11. 如权利要求 9 所述的计算机可执行处理，其特征在于，所述将每个所述白板图像帧分成前景、白板背景或写在白板上的内容的笔划单元的处理动作包括下述处理动作：

对于所述图像序列中图像帧的所有图像帧单元：

输入一个图像帧单元；

将所述图像帧单元与先前帧中对应位置上的单元进行比较；

如果该单元寿命不大于寿命阈值，就将该单元分类作为前景单元；所述寿命是该单元未变化的帧数；

如果该单元寿命大于寿命阈值，就确定在单元颜色中是否存在任何显著的差异，

如果单元颜色中不存在显著的差异，就将该单元分类为前景单元；

如果单元颜色中存在显著的差异，确定所述单元是否含有边缘；

如果该单元含有边缘，将其分类为笔划单元；并且

如果该单元不含有边缘，就将其分类为白板背景单元。

12. 如权利要求 11 所述的计算机可执行处理，其特征在于，进一步包括对分类成前景单元的所述单元验证其为前景单元的处理动作，所述动作包括下述处理动作：

确定所述前景单元是否与其它前景单元连接；以及

如果该单元确定为前景单元，且不与其它单元相连，还原其分类为未知。

13. 如权利要求 11 所述的计算机可执行处理，其特征在于，所述确定在单元颜色中是否存在任何显著差异的处理动作包括下述处理动作：

检验单元的 Y,U,V 通道；

如果所述单元颜色的 Y,U,V 通道没有分别处于离所述白板颜色模型中对应位置单元的 15、5 和 5 强度级的范围中，说明在单元颜色中存在显著差异。

14. 如权利要求 12 所述的计算机可执行处理，其特征在于，如果在 5X5 单元邻域中前景单元没有和其它前景单元相连，就说明存在少于 6 个的前景单元。

15. 如权利要求 12 所述的计算机可执行处理，其特征在于，所述判定所述单元是否含有边缘的处理动作包括下述处理动作：

对于每个帧单元，

使用 Sobel 滤波器来识别所述单元的水平边缘以获得第一经滤波的 Sobel 图像；

使用 Sobel 滤波器来识别所述单元的垂直边缘以获得第二经滤波的 Sobel 图像；

确定存在于每个帧中的边缘值数目，其中一个边缘值被定义为是在两个经 Sobel 滤波的图像中对应像素的绝对值的总和；

对于每个单元，对于 N 帧是固定的，其中：

当在帧 N 和 N+1 的单元中的所有像素都相同时，该单元对于连续帧 N 到 N+1 是固定的，

并且该单元含有的边缘值，该值大于预定阈值，

将该单元考虑作为笔划单元。

16. 如权利要求 15 所述的计算机可执行处理，其特征在于，如果所有像素的平均绝对差值低于预定阈值，则在帧 N 和 N+1 的单元中的所有像素是相同的。

17. 如权利要求 16 所述的计算机可执行处理，其特征在于，所述预定阈值以强度级来定义。

18. 如权利要求 15 所述的计算机可执行处理，其特征在于，所述笔划单元中的所述边缘值定义了笔划的边缘。

19. 如权利要求 1 所述的计算机可执行处理，其特征在于，进一步包括在将图像帧的每个单元分成前景、白板背景或写在白板上的内容的笔划单元的处理动作之后，确定白板背景颜色模型是否应被更新的处理动作。

20. 如权利要求 19 所述的计算机可执行处理，其特征在于，确定白板背景颜色模型是否应被更新的处理动作包括下述处理动作：

通过检验过去图像帧序列逐渐到当前白板帧中对应的单元的平均颜色来识别白板颜色中的任何逐渐变化；

如果在白板颜色中识别出逐渐变化，确定所有可用白板颜色模型的白板颜色模型数据库中的当前白板颜色模型是否更新。

21. 如权利要求 20 所述的计算机可执行处理，其特征在于，如果平均单元颜色几乎相等，但与先前帧不相等，进一步包括下述处理动作：

确定发生了逐渐亮度变化；并

对白板背景和具有白板背景颜色的笔划单元更新当前白板背景颜色模型。

22. 如权利要求 21 所述的计算机可执行处理，其特征在于，对白板 and 笔

划单元更新白板颜色模型的处理动作包括下述处理动作：

将白板图像分成多个单元；

根据像素的亮度值将每个单元中的像素分类；以及

将每个单元中最高的亮度值分配作为该单元所得到的白板颜色。

23. 如权利要求 22 所述的计算机可执行处理，其特征在于，进一步包括滤波单元颜色的处理动作，它包括下述处理动作：

将所得到的单元颜色施加给最小中值平方误差处理，该算法在全平面上使颜色拟合，并将前景单元丢弃；

将剩余的单元指定为白板背景单元；

使用所述剩余白板背景单元来更新白板背景；

并且，对在白板颜色模型中由被丢弃的前景单元所产生的缺口用来自具有白板背景颜色的相邻单元的已知颜色进行填充。

24. 如权利要求 22 所述的计算机可执行处理，其特征在于，所述单元的大小应大致等于在白板上所期望的单个字符的大小。

25. 如权利要求 21 所述的计算机可执行处理，其特征在于，所述为白板和笔划单元更新白板颜色模型的处理动作包括下述处理动作：

将白板图像分成多个单元；

根据像素的亮度值将每个单元中的像素分类；以及

将每个单元中最高 10% 的亮度值进行平均，并将该值作为该单元所得到的白板颜色。

26. 如权利要求 25 所述的计算机可执行处理，其特征在于，单元大小应大致等于在白板上所期望的单个字符的大小。

27. 如权利要求 21 所述的计算机可执行处理，其特征在于，更新白板背景颜色的处理动作包括：

取较大百分比的最近白板背景颜色模型和较小百分比的新白板背景颜色，并对它们求和以获得新白板背景颜色。

28. 如权利要求 27 所述的计算机可执行处理，其特征在于，较大百分比的最近白板背景颜色模型为 90%，而较小百分比的新白板背景颜色为 10%。

29. 如权利要求 1 所述的计算机可执行处理，其特征在于，确定在所述

单元中是否存在显著光照变化的处理动作包括下述处理动作：

确定是否多数单元表现出颜色变化，以及如果是，就指定发生了光照变化。

30.如权利要求 29 所述的计算机可执行处理，其特征在于，所述多数定义为有 95% 的单元表现出颜色变化。

31.一种用于对白板数据内容采用流技术的系统，所述系统包括：

分类模块，用于将被分成多个单元的白板图像序列中每个单元分成笔划单元、白板背景单元或前景单元；

动态白板背景和初始化模块，用于确定所述单元中的白板背景颜色；

图像增强模块，用于对由白板背景、前景和笔划单元组成的图像进行增强；以及

用于添加和去除白板笔划数据的模块，以使用白板背景和笔划单元来创建白板图像。

32.如权利要求 31 所述的系统，其特征在于，进一步包括用于对白板图像数据形成流的模块，其中所述白板图像数据由白板背景单元、前景单元和笔划单元组成。

33. 如权利要求 31 所述的系统，其特征在于，进一步包括用于对白板内容数据形成流的模块，其中所述白板内容数据由白板背景单元和笔划单元组成。

34. 如权利要求 31 所述的系统，其特征在于，所述对白板内容数据进行分类的模块包括下述子模块：

对所述白板图像序列中所有的单元：

输入图像帧单元；

将所述图像帧单元与先前帧同一位置中的单元图像进行比较；

如果单元寿命不大于寿命阈值，则将该单元分类作为前景单元；

将超过 N 帧都保持固定的所有单元分配为背景候选者；

确定在单元颜色中是否存在任何显著差异，如果存在，将该单元分类作为前景单元；

确定分类为前景单元的单元是否与其它前景单元相连；

如果分类作为前景单元的单元没有和其它单元相连，就将其分类还原为未知；

确定所述单元是否含有边缘；

如果该单元含有边缘，将其分类为笔划单元；并且

如果该单元不含有边缘，就将其分类为白板背景单元。

35. 如权利要求 31 所述的系统，其特征在于，将某些，但不是所有的，记录在白板视频流中的图像用于创建所述图像序列。

36. 如权利要求 31 所述的系统，其特征在于，将所有记录在白板视频流中的图像用于创建所述图像序列。

37. 一种计算机可读媒体，具有用于传送白板视频流的计算机可执行指令，所述计算机可执行指令包括：

输入白板图像帧序列；

将每个所述白板图像帧分成各个单元；

判断在所述图像序列中的所述单元内是否存在显著的光照变化；

如果存在显著的光照变化，就执行白板颜色匹配处理以确定白板的颜色；

如果不存在显著光照变化，就将图像帧的每个单元分成前景、白板背景或写在白板上的内容的笔划单元；以及

对所述图像帧序列进行增强，以便能以使用所述单元分类的增强形式仅显示白板上的笔划。

38. 如权利要求 37 所述的计算机可读媒体，其特征在于，进一步包括用于仅使用所述白板背景和笔划单元来输出所述增强图像序列的计算机可执行指令。

39. 如权利要求 37 所述的计算机可读媒体，其特征在于，进一步包括用于仅使用所述白板背景、前景单元和笔划单元来输出所述增强图像序列的计算机可执行指令。

40. 一种用于传送增强白板图像视频流的系统，所述系统包括：

发送器，包括：

输入模块，用于输入所捕获白板图像序列和与所捕获白板图像序列同



步化的音频，并将所述每个图像分成多个单元；

分类模块，用于将白板图像数据分类成笔划单元、白板背景单元或前景单元；

动态白板背景和初始化模块；

图像增强模块，用于对所述笔划单元中的笔划进行增强，并使得白板背景单元颜色更加统一；以及

用于添加和去除白板笔划数据的模块；

发送模块，用于通过网络使用所述前景单元、白板背景单元和笔划单元将包含前景对象的第一增强白板图像数据流发送给接收器；以及通过网络使用所述笔划单元和白板背景单元，但不包括前景单元，将不包含前景对象的第二增强白板图像数据流发送给接收器。

41.如权利要求 40 所述的系统，进一步包括接收器，所述接收器包括：

接收模块，通过网络接收从所述发送器发送的所述增强白板图像和同步化的音频；

扬声器模块，播放所述同步化的音频；以及

显示模块，在接收器处显示所述增强的白板图像。

42.如权利要求 41 所述的系统，其特征在于，所述接收器进一步包括用于选择所述接收器是要将第一数据流还是第二数据流显示在所述显示模块上的模块。

43. 如权利要求 41 所述的系统，其特征在于，所述接收器进一步包括将给所述白板数据流的注解发送回所述发送器。

44. 如权利要求 43 所述的系统，其特征在于，所述发送器通过投影仪将所述注解投射在白板上以将所述注解叠加在所述白板上，从而将所述接收机发送的所述注解显示在所述白板上。

45. 如权利要求 43 所述的系统，其特征在于，所述发送器通过将所述注解叠加在单独显示器的所述白板上，从而将所述注解显示在所述白板上，其中所述白板图像和所述注解都被显示。

46. 如权利要求 40 所述的系统，其特征在于，所述发送器进一步包括用于将所述第一和第二数据流归档以供日后查阅或发送的模块。

47. 如权利要求 40 所述的系统，其特征在于，所述动态白板背景估计和初始化模块采用下述方式来估计白板颜色：

对于第一输入图像：

为每个像素初始化白板背景颜色，为每个像素关联一个协方差估值，该估值表征了所述像素颜色的精度，将初始化的白板颜色指定为估计的白板颜色；

给出输入图像，在每个像素处，将白板估计颜色与所述输入图像中实际观测的颜色进行比较，并且

如果所估计的颜色和所观测的颜色差异巨大，则所观测的像素不是笔划的一部分就是前景对象的一部分，并且丢弃该像素的颜色；

否则，该像素的颜色就是白板颜色的观测值，并在更新白板颜色中使用；并且

在概率框架下将没有被丢弃的这些像素的颜色更新，其中每个像素的改变多少取决于当前所观测像素对于所估计颜色来说有多可靠，当前所观测像素对于所估计颜色来说有多大不同，以及所观测像素颜色与相邻像素中的颜色有多大不同。

48. 如权利要求 47 所述的系统，其特征在于，当更新像素颜色时，每个像素的颜色估计的协方差矩阵也会更新。

49. 如权利要求 47 所述的系统，其特征在于，所述动态白板背景估计和初始化模块通过下述方式估计白板颜色：

对于所述第一输入图像之后的后续输入图像：

对每个像素将已更新所估计的白板颜色与所述输入图像中实际观测的颜色进行比较，并且

如果所更新的估计颜色和所观测的颜色差异巨大，则所观测的像素不是笔划的一部分就是前景对象的一部分，并且丢弃该像素的颜色；

否则，该像素的颜色就是白板颜色的观测值，并在更新白板颜色中使用；并且

在概率框架下将没有被丢弃的这些像素的颜色更新，其中每个像素的改变多少取决于当前所观测像素对于所估计颜色来说有多可靠，当前所观测



像素对于所估计颜色来说有多大不同，以及所观测像素颜色与相邻像素中的颜色有多大不同。

50.如权利要求 40 所述的系统，其特征在于，所述动态白板背景估计和初始化模块以下述方式估计白板颜色：

对于第一输入图像：

将白板分成各个单元；

为每个单元初始化白板背景颜色，为每个单元关联一个协方差估值，该估值表征了所述单元颜色的精度，将初始化的白板颜色指定为估计的白板颜色；

给出输入图像，在每个单元，将白板估计颜色与所述输入图像中实际观测的颜色进行比较，并且

如果所估计的颜色和所观测的颜色差异巨大，则所观测的单元不是笔划的一部分就是前景对象的一部分，并且丢弃该单元的颜色；

否则，该单元的颜色就是白板颜色的观测值，并在更新白板颜色中使用；并且

在概率框架下将没有被丢弃的这些单元的颜色更新，其中每个单元的改变多少取决于当前所观测单元对于所估计颜色来说有多可靠，当前所观测单元对于所估计颜色来说有多大不同，以及所观测单元颜色与相邻单元中的颜色有多大不同。

51.如权利要求 50 所述的系统，其特征在于，当更新单元颜色时，每个单元处的颜色估计的协方差矩阵也会更新。

52.如权利要求 50 所述的系统，其特征在于，所述动态白板背景估计和初始化模块通过下述方式估计白板颜色：

对于所述第一输入图像之后的后续输入图像：

对每个单元将已更新所估计的白板颜色与所述输入图像中实际观测的颜色进行比较，并且

如果所更新的估计颜色和所观测的颜色差异巨大，则所观测的单元不是笔划的一部分就是前景对象的一部分，并且丢弃该单元的颜色；

否则，该单元的颜色就是白板颜色的观测值，并在更新白板颜色中

使用；并且

在概率框架下将没有被丢弃的这些单元的颜色更新，其中每个单元的改变多少取决于当前所观测单元对于所估计颜色来说有多可靠，当前所观测单元对于所估计颜色来说有多大不同，以及所观测单元颜色与相邻单元中的颜色有多大不同。

53. 一种从图像序列中动态实时估计白板颜色的计算机可执行处理，包括下述处理动作：

定义状态变量  $x_{i,j}$  为要估计的每个单元  $(i, j)$  处的白板的颜色，而观察变量  $z_{i,j}$  是从图像中观测的每个单元  $(i, j)$  白板的颜色；

如下计算每个单元的颜色：

$$x'_{i,j} = ((\hat{P}_{i,j}^{n-1})^{-1} + (Q'_{i,j})^{-1} + (S'_{i,j})^{-1})^{-1} (\hat{P}_{i,j}^{n-1})^{-1} \hat{x}_{i,j}^{n-1} + (Q'_{i,j})^{-1} z'_{i,j} + (S'_{i,j})^{-1} \bar{x}'_{i,j}$$

对于第一次迭代，使用预期平均值， $\frac{1}{\Omega} \sum_{(k,l) \in \Omega(i,j)} x_{k,l}^{n-1}$ ，作为  $\bar{x}'_{i,j}$ ，其中  $\Omega$  是相邻

单元的数目， $k \in [i-1, i+1]$ ，而  $l \in [j-1, j+1]$ ，并且  $(k, l) \neq (i, j)$ ；并且在随后的迭代中，采用来自先前迭代的估计平均值。并且，给出如下  $x'_{i,j}$  的协方差：

$$P'_{i,j} = ((\hat{P}_{i,j}^{n-1})^{-1} + (Q'_{i,j})^{-1} + (S'_{i,j})^{-1})^{-1} (2I + (S'_{i,j})^{-1} \bar{P}'_{i,j})$$

其中  $I$  是单位矩阵，并且  $\bar{P}'_{i,j} = \frac{1}{\Omega} \sum_{(k,l) \in \Omega(i,j)} P'_{k,l}$ ，并将预期平均数  $\frac{1}{\Omega} \sum_{(k,l) \in \Omega(i,j)} \hat{P}_{k,l}^{n-1}$  作为第一迭代中的  $\bar{P}'_{i,j}$ ，其中观测协方差是观测协方差是  $Q'_{i,j}$ ，平滑度协方差矩阵是  $S'_{i,j}$ ，状态变换噪声  $\eta'_{i,j}$  和它的协方差矩阵是  $R'_{i,j}$ 。

## 用于实时白板流技术的系统和方法

本申请请求在 2003 年 2 月 24 日申请，依据 U.S.C 第 119(e)(1) 节第 35 条下的临时申请号为 60/449,683 的申请的优先权。

### 技术领域

本发明针对一种用于在网络环境中使用流技术（streaming）将白板（whiteboard）内容传送给计算设备的系统和方法。更具体地说，本发明涉及一种用于将经增强的白板图像序列实时发送给一个或多个远程会议参与者以允许在会议期间为所有会议参与者提供基于网络的协作。

### 背景技术

各种会议占据了许多工作人员工作时间的很大部分。如何有效地利用会议时间和节省会议期间往来的费用被企业作为增加生产力和成本节约方面的有效手段而越来越重视。

许多会议组织者已经在头脑风暴会议、讲座、项目计划会议、专利公布等会议中广泛采用了白板技术。在这些会议期间，对写在板上的内容的笔记和复制经常影响到许多参与者的积极投入和贡献。因此，人们已经在以某些自动方式来捕获白板内容的技术方面花费了一些努力。

每个企业都需要信息和意见的自由交流以改善它们的产品和服务。在团队中和团队外的人员之间的有效协作可以提高产品质量、提升产品或项目开发的研制周期并减少成本。然而，有效的协作通常是很难实现的。而阻碍有效会议的一个问题就是通常人们在地域上并不在一起。考虑到冗长的旅程的时间，参加会议的行程是非常耗费时间和金钱的。为参加一个 2 到 3 小时会议的人可能将花费一天时间在旅程上，还需要花费一天时间在回程上，特别是当召开跨国界或跨大陆会议时，该问题更加突出。

因此，人们很强烈地需要一种方式来使得在召开地域上不处于一起的许多人

参加的会议时能更加容易轻松，以允许这些远程参与者实时参与会议并共享他们的意见。

### 发明内容

本发明针对一种用于在网络环境中使用流技术将白板内容传送给计算设备的系统和方法。这种称之为实时白板流技术系统和方法的发明是一种对白板图像生成技术的扩展，以在会议期间提供基于网络的协作。在本发明的一个实施例中，网络客户可以接收会议的音频内容和增强的白板内容（视频图像或快照图像序列）。在另一实施例中，每个联网客户可以发送音频内容和注解内容，该注解内容显示在来自实际白板的单独屏幕上，或由实际白板自身产生。该流技术内容是建立在外部协作构架上，例如微软公司的 Windows Messenger 和 Net Meeting。将白板的增强实况视频以流技术传送给远程会议参与者的个人计算机（PCs），然后，他们可以将评论和注解再传送回来。由此产生的系统可以为分布式会议提供了自然的协作性工具。

该系统的典型方案包括涉及头脑风暴会议。该会议涉及到在聚集在某地（典型的是在会议室中）的  $N$  个人，以及  $M$  个（通常是 1 到 3）个人（远程用户），每个人可能在他们自己的办公室中或其它远程地点。

聚集在会议室中的  $N$  个人配备有白板、捕获白板内容的摄像头、捕获会议音频的麦克风设备、会议服务器、投影仪、电视或其它显示器，它们连接到所述会议服务器上；以及安装在麦克风设备上的扬声器。而  $M$  个个人中的每个人坐在他们自己的办公室或其它远程地点，配备有桌面计算机或笔记本电脑、扬声器、麦克风以及将远程个人计算机与会议服务器相连的网络连接。

在会议室中的  $N$  个人使用白板作为协作空间，通过在白板上描绘来共享他们的意见。在白板上的内容迅速被捕获（实际上是实时捕获），并通过网络将白板的增强图像传送给远程人员以使它们能共享内容。而口头上的讨论将由麦克风捕获，并且该音频，最好和定向信息一起，例如使用音频指纹的音频跟踪一起，也通过这个装置发送给远程人员。

而参加会议的远程人员通过在会议室中由扬声器播放的音频来参与会议。远程人员可以通过在捕获的白板帧上注解来参与会议，并且经注解的白板帧会显示

在会议室的显示器上以及其它远程个人计算机的屏幕上。另外，还可以使用例如蜂鸣器或某些视觉提示信号来提醒会议参与者，远程参与者已经向白板内容进行输入。

整个会议（包括注解）都能归档，以便在将来进行查阅。白板和注解作了时间标记，并与音频同步。

如前所述，远程参与者可以在白板内容上提供注解和口头评论。会议室中的屏幕（它与白板不同）显示了白板内容和注解。一种替换的方案是将远程参与者的注解直接投影到会议室的实际白板上。该方案的好处在于远程参与者能积极参与白板内容的进展。

在上述的方案中，远程参与者使用的是传统的 PC。然而，远程参与者也可以使用平板 PC（Tablet PC）。微软公司的平板 PC 是针对全配置个人计算机设计的，它允许用户使用输入笔或数字感应触摸屏代替键盘来通过自然手写笔记。墨水（ink）技术可以使得远程参与者进行注解（无论是公开的和/或私人的）变得更加容易。

如上所述，实时白板流技术系统和方法具有基于服务器的端和基于客户的端。在下面的段落中，将进一步详细描述。

实时白板流技术系统和方法的服务器端通常由 4 个主要部分组成：1）分类处理，将图像序列单元分类成背景、前景或笔划单元（stroke cell）；2）动态白板背景初始化和更新处理，计算白板颜色而不包括前景对象（例如人员）和笔划；3）有效实时处理，对输入视频序列中的白板区域进行增强；4）分析处理，提取白板上新出现的笔划。

如本发明所述的系统和方法最初获取由白板图像帧实时序列构成的一系列快照或实况白板视频输入。该快照序列或视频以逐帧为基础进行实时处理。

白板图像帧序列（快照或视频）输入给基于单元运动检测的处理。在该处理中，在给定帧序列中的每个图像帧分成了几个单元。对每个对应的单元位置随时间变化进行比较，以检测光或色中的任何变化。如果有显著的光照变化，就执行白板颜色匹配处理动作，这将随后进行详细描述。如果没有显著的光照变化，该视频帧的每个单元就分类成前景、白板背景或笔划单元。在单元分类中，其主要意图在于过滤掉遮挡白板部分的人或其它对象的图像部分，以便在白板背景上仅

显示白板内容的笔划。

单元分类也用于创建白板视频流，它是一种具有白板和前景对象（例如站在所显示白板之前的人员）的增强的实况视频流。还会创建其它数据流，如白板和仅有笔划数据流，其中以增强方式在白板上仅显示白板的笔划，而不显示前景对象。

为了显示含有白板和前景对象的增强图像，执行图像增强处理。在图像增强处理中，白板颜色更加统一，而白板内容（也就是写在白板上的内容）的笔划饱和度增加以使得笔划更加鲜明和易读。

单元分类的另一输出是判断是否添加了笔划或从白板中去除了笔划。在这种处理动作中，实时白板流技术系统和方法确定单元中的笔划内容是否增加或减少了（即对应于附加的写或擦除白板内容）。如果单元的笔划内容发生了变化，这些内容的变化就输出给白板数据流。

另外，在单元分类之后，系统判定白板颜色模型是否需要更新。白板颜色模型更新处理是对白板颜色中的逐渐变化的识别。例如，亮度条件中的这些微小变化是由于云彩从太阳前经过或某些东西在白板上投下阴影。如果逐渐的亮度变化被识别，则更新白板颜色模型中当前白板颜色的模型。

如前所述，显著的光变化在基于单元的运动检测处理中被记录，如本发明所述的系统或方法就判定所记录的亮度变化是否包含在当前白板颜色模型中。如果新亮度条件对应于白板颜色模型数据库中的白板颜色模型，该模型就用于后续单元分类。然而，如果没有找到颜色模型，就初始化或估计新的颜色模型，并将其加入到白板颜色模型数据库中。

如本发明所述的系统和方法具有许多优点。它允许远程会议参与者积极参加会议，而不需要花费时间和金钱去远程地点开会。它提供了一种具有前景对象的更加易读的白板数据流形式，以及提供了不具有前景对象的更加易读的白板内容数据流。

除了上述的优点之外，本发明的其它优点可以从下面结合附图的具体描述中进一步体现出来。

附图说明



本申请的文件中含有至少一张彩色的附图。具有彩色附图的本申请文本将在申请人请求并支付所需费用后由美国专利和商标局提供。

本发明的特定特征、方面和优点将通过下述描述、权利要求和附图变得更容易理解。

图 1 是描述构成实现本发明的示范系统的通用计算设备的框图。

图 2 是实时白板流技术系统和方法的主要系统部件的框图。

图 3 是实时白板流技术系统和方法的主要功能部分的框图。

图 4 是如本发明所述的系统和方法概括流程图。

图 5 是一系列输入图像的框图。

图 6 是如本发明所述的系统和方法所使用的白板图像单元的单元分类的概括流程图。

图 7 是如本发明所述的系统和方法所使用的白板颜色估计处理的概括流程图。

图 8 是如本发明所述的系统和方法所使用的白板图像增强的概括流程图。

图 9 是如本发明所述的系统和方法所述的笔划识别和提取的概括流程图。

图 A-1 是用于说明如本发明所述的系统和方法所述的白板颜色估计和过滤的框图。

## 具体实施方式

在本发明的较佳实施例的下述描述中，参考了作为说明书一部分的附图进行描述，所述附图说明了本发明可以采用的特定实施例。本领域技术人员应该理解在不背离本发明精神的情况下，还可以使用其它实施例或对这些实施例进行修改。这都没有超出本发明的公开范围。

### 1.0 示范工作环境

图 1 示出了可以实现本发明的一种合适的计算系统环境 100 实例。该计算系统环境 100 只是一个合适的计算环境的实例，并不是要将本发明的使用和功能范围局限在该环境中。也不是要将计算环境 100 解释为与示范工作环境 100 中所示部件之一或其组合具有联系或要求。

本发明可以在许多其它通用或专用计算系统环境或配置中工作。这些适用于本发明的众所周知的计算系统、环境和/或配置的实例可以包括（但不局限于）个人计算机、服务器计算机、手提或膝上型设备、多处理器系统、基于微处理器的系统、机顶盒、可编程消费类电子产品、网络 PC、微型计算机、大型机、包含上述任意系统和设备的分布式计算环境，等等。

本发明从计算机可执行指令的概括角度进行描述，例如以计算机可执行的程序模块来进行描述。通常，程序模块包括例行程序、程序、对象、部件、数据结构等，它们能执行特定任务或实现特定抽象数据类型。本发明也可以在分布式计算环境中实现，在这种环境中，由通过通信网络连接的远程处理设备来执行任务。在分布式计算环境中，程序模块可以位于包含存储器存储设备的本地和远程计算机存储媒体中。

参照图 1，一种执行本发明的示范系统包括以计算机 110 形式出现的通用计算设备。该计算机 110 的部件包括（但不局限于）处理单元 120、系统存储器 130 和系统总线 121，它将各种系统部件（包括系统存储器到处理单元 120）都连接在一起。系统总线 121 可以是下述几种总线结构类型中任意一种：存储器总线或存储器控制器、外设总线和使用各种总线体系的局域总线。这种体系包括例如（但不局限于）工业标准结构（ISA）总线、微通道结构（MCA）总线、扩展 ISA（EISA）总线、视频电子标准协会（VESA）局域总线以及外设部件互连（PCI）总线，也称为中层总线（Mezzanine bus）。

计算机 110 通常包括各种计算机可读媒体。计算机可读媒体包括任何可由计算机 110 存取的可用媒体，包括易失和非易失媒体、可移动和非可移动媒体。计算机可读媒体可以包括例如（但不局限于）计算机存储媒体和通信媒体。计算机存储媒体包括易失和非易失、可移动和非可移动媒体，这些媒体可以用于任何存储信息，例如计算机可读指令、数据结构、程序模块或其它数据，的方法或技术实现。计算机存储媒体包括（但不局限于）RAM、ROM、EEPROM、闪存或其它存储器技术、CD-ROM、数字通用光盘（DVD）或其它光盘存储、磁带盒、磁带、磁盘存储或其它磁性存储设备、或任意其它可用于存储所需信息并可被计算机 110 存取的媒体。通信媒体通常包含计算机可读指令、数据结构、程序模块或其它调制数据信号（例如载波）或其它传输机制



中的数据，并且包括任何信息传递媒体。术语“调制数据信号”是指以对信号中信息编码的方式使其一个或多个特性被设定或改变的信号。通信媒体包括（但不局限于）有线媒体例如有线网络或直线连接、以及无线媒体例如声音、RF、红外线和其它无线媒体。上述媒体的任意组合也应包含在计算机可读媒体的范畴。

系统存储器 130 包括易失和/或非易失存储器形式的计算机存储媒体，例如只读存储器（ROM） 131 和随机访问存储器（RAM） 132。基本输入/输出系统 133（BIOS），含有例如在启动期间帮助在计算机 110 中的元件之间传送信息的基本例行程序，通常存储在 ROM 131 中。RAM 132 通常含有立刻就要存取和/或目前正在被处理单元 120 处理的数据和/或程序模块。图 1 示例出（但不局限于）操作系统 134、应用程序 135、其它程序模块 136 以及程序数据 137。

计算机 110 可以包括其它可移动/非可移动、易失/非易失计算机存储媒体。图 1 示例出（但不局限于）可以对非可移动、非易失磁性媒体进行读写的硬盘驱动器 141，可对可移动、非易失磁盘 152 进行读写的磁盘驱动器 151，以及可对可移动、非易失光盘（例如 CD-ROM 或其它光学媒体 156）进行读写的光盘驱动器 155。其它可用于示范操作环境的可移动/非可移动、易失/非易失计算机存储媒体包括（但不局限于）磁带盒、闪存卡、数字通用光盘、数字摄像带、固态 RAM、固态 ROM 等等。硬盘驱动器 141 通常通过即时-可移动（anon-removable）存储器接口（例如接口 140）与系统总线 121 连接，而磁盘驱动器 151 和光盘驱动器 155 通常通过可移动存储器接口（例如接口 150）与系统总线 121 相连。

在如上所述和图 1 中所示的驱动器及其相关的计算机存储媒体为计算机可读指令、数据结构、程序模块和计算机 110 的其它数据提供了存储。在图 1 中，例如，硬盘驱动器 141 如图所示存储了操作系统 144、应用程序 145、其它程序模块 146 以及程序数据 147。注意这些部分可以与操作系统 134、应用程序 135、其它程序模块 136 以及程序数据 137 相同，也可以不同。操作系统 144、应用程序 145、其它程序模块 146 以及程序数据 147 在这里用不同的标号是为了说明至少它们是不同的副本。用户可以通过输入设备例如键盘 162 和指点设备 161（通常指鼠标、轨迹球或触摸板）将命令和信息输入到计算机

110 中。其它输入设备（未示出）可以包括麦克风、操纵杆、游戏手柄、卫星天线、扫描仪等。这些和其它输入设备通常通过连接到系统总线 121 的用户输入接口 160 连接到处理单元 120，但也可以由其它接口或总线结构连接，例如并行口、游戏端口或通用串行总线（USB）。监视器 191 或其它类型的显示设备也通过接口（例如视频接口 190）连接到系统总线 121。除了监视器外，计算机还可以包括其它外围输出设备，例如扬声器 197 和打印机 196，它们可以通过输出外围接口 195 进行连接。而能捕获图像 164 序列的摄像头 163（例如数字/电子静态或视频摄像机）作为本发明特别重要的设备也可作为输入设备包括在个人计算机 110 中。而且，虽然只描述了采用一个摄像头的情况，但个人计算机 110 也可采用多个摄像头作为输入设备。来自一个或多个摄像头的图像 164 通过合适的摄像头接口 165 输入到计算机 110 中。该接口 165 连接到了系统总线 121，因而允许图像发送并存储在 RAM 132 或与计算机 110 相关的其它数据存储设备中的一个中。然而，需要注意，图像数据也可以从任意上述计算机可读媒体中输入到计算机 110，而不需要使用摄像头 163。

计算机 110 可以在使用物理连接一个或多个远程计算机（例如远程计算机 180）的联网环境中运行。该远程计算机 180 可以是个人计算机、服务器、路由器、网络 PC、对等设备或其它公共网络节点，并且虽然在图 1 中仅示出存储器存储设备 181，但通常还包括上述有关计算机 110 的许多或所有元件。在图 1 中所示的物理连接包括局域网（LAN）171 和广域网（WAN）173，但也可以包括其它网络。这些网络环境在办公室、企业计算机网络、内联网和互联网中已经广泛采用。

当在 LAN 网络环境中使用时，计算机 110 通过网络接口或适配器 170 连接到 LAN 171。当在 WAN 网络环境中使用时，计算机 110 通常包括调制解调器 172 或其它与 WAN 173，例如互联网，建立通信的装置。调制解调器 172 可以是内置的，也可以是外置的，可通过用户输入接口 160 连接到系统总线 121，或其它合适的机构。在网络环境中，有关计算机 110 所描绘的程序模块或其部分可以存储在远程存储器存储设备中。图 1 示例出（但不局限于）驻留在存储器设备 181 上的远程应用程序 185。需要注意，所示的网络连接是示例性的，也可以使用其它装置在计算机之间建立通信连接。

现在，已经讨论了示范操作环境，本说明书部分的剩余内容将致力于描述实现本发明的程序模块。

## 2.0 实时白板流技术的系统和方法

### 2.1 概述

实时白板流技术的系统和方法通常具有基于服务器的部件，并且能具有一个或多个安排在基于网络的环境中的远程客户机。增加的实况视频或增强实时白板快照序列以流技术传送给远程会议参与者的 PC，而他们可以在白板内容上发送回注解以及在会议进程中进行口头评论。

如图 2 所示，典型的这种系统的方案包括头脑风暴会议，它涉及到处于某地（例如典型的会议室 202）的 N 个人，以及 M 个（通常是 1 到 3 个）远程人员 204a ...， 204m，每个人员位于他们自己的办公室中或其它远程地点。

聚集在会议室 202 中的 N 个人配备有白板 206、捕获白板内容的摄像头 208、捕获会议音频的麦克风 210、会议服务器、投影仪、电视或其它显示器 212，它们连接到所述会议服务器 214 上；以及安装在麦克风设备上的扬声器 216。而 M 个人中的每个人坐在他们自己的办公室或其它远程地点 204a ...， 204m，配备有桌面计算机或笔记本电脑 218、扬声器（未示出）、麦克风/耳机 220 以及将远程个人计算机 218 与会议服务器 214 相连的网络连接 222。

在会议室 202 中的 N 个人使用白板 206 作为协作空间，通过在白板上描绘来共享他们的意见。在白板上的内容迅速被捕获，并通过将增强白板内容传送到远程人员的计算机 218a ...， 218m，使得远程人员能共享内容。而口头上的讨论将由麦克风 210 捕获，并且该音频（最好和定向信息一起）发送给远程人员。

而参加会议的远程人员通过在会议室中由扬声器 216 播放的音频来参与会议。远程人员也可以通过在捕获的白板帧上注解来参与会议，并且经注解的白板帧会显示在会议室的显示器 212 上以及其它远程个人计算机 218a ...， 218m 的屏幕上。另外，还可以使用例如蜂鸣器或某些视觉闪烁警示信号来提醒会议参与者，远程参与者已经作出了注解。

### 2.2 基于服务器的实时白板流技术系统和方法

通常，如图 3 所示，实时白板流技术系统和方法在功能上由 4 个主要部分组成：1) 分类处理，将图像序列单元分类成背景、前景或笔划单元（处理动作 302）；2) 动态白板背景初始化和更新处理，计算白板颜色而不包括前景对象（例如人员和笔划（处理动作 304）；3) 有效实时处理，对输入视频序列中的白板区域进行增强（处理动作 306）；4) 分析处理，提取白板上新出现的笔划（处理动作 308）。图像增强处理的输出是一个增强白板图像序列（处理动作 310），而笔划分析处理的输出仅是流技术化白板数据（处理动作 312）。

更具体地说，如图 4 所示，如本发明所述的系统和方法最初获取由白板图像帧实时序列构成的实况白板输入，如在处理动作 402 中所示。该视频、快照或图像序列以逐帧为基础进行实时处理。

白板图像帧序列输入给基于单元运动检测的处理 404。在该处理中，在给定帧序列中的每个图像帧分成了几个单元。对每个对应的单元位置随时间变化进行比较，以检测亮度中的任何变化（处理动作 406）。如果有显著的亮度变化，就执行白板颜色匹配处理动作（处理动作 408），这将随后进行详细描述。如果没有显著的亮度变化，该视频帧的每个单元就分类成前景、白板背景或笔划单元（处理动作 410）。在单元分类中，其主要意图在于过滤掉遮挡白板部分的人或其它对象的图像部分，以便在白板背景上仅显示白板内容的笔划。单元分类也用于创建白板图像流，它是一种具有白板和前景对象（例如站在所显示白板之前的人员）的增强的实况视频或快照流，如处理动作 414 所示。该流通过增强处理进行增强，如处理动作 412 所示。还会创建其它数据流（白板数据流），其中在笔划处理（处理动作 416）执行之后，以增强方式在白板上仅显示笔划，而不显示前景对象（处理动作 418）。

为了显示含有白板和前景对象的增强图像，执行图像增强处理，如处理动作 412 所示。在图像增强处理（处理动作 412）中，白板颜色更加统一，而白板内容（也就是写在白板上的内容）的笔划饱和度增加以使得笔划更加鲜明和易读。

单元分类的另一输出是判断是否添加了笔划或从白板中去除了笔划，如处理动作 416 所示。在这种处理动作中，实时白板流技术系统和方法判定单元中的笔划内容是否增加或减少了。如果单元的笔划内容发生了变化，该内容就输出给白板数据流（处理动作 418）。

另外，如处理动作 420 所示，在单元分类之后，系统判定白板颜色模型是否需要更新。白板颜色模型更新处理是对白板颜色中的逐渐变化的识别。这种变化是由于例如，光照条件中的微小变化，而这些微小变化是由于例如云彩从太阳前经过或某些东西在白板上投下阴影。如果变化被识别，则更新白板颜色模型数据库 422（是所有可用白板颜色模型的数据库）中当前白板颜色的模型。

如前所述，如果显著的光照变化在基于单元的运动检测处理中被记录（处理动作 406），如本发明所述的系统或方法就判定所记录的光照变化是否体现在当前白板颜色模型中（处理动作 408）。如果新光照条件对应于白板颜色模型数据库中的白板颜色模型（处理动作 424），该模型就用于后续单元分类。然而，如果没有找到该颜色模型，就初始化新的颜色模型（处理动作 426），并将其加入到白板颜色模型数据库中。

上面已经描述了根据本发明的通用系统和方法，随后将详细描述先前所述的处理动作。

#### 2.2.1 实况白板视频或快照序列输入

根据本发明的系统和方法最初获取实况白板视频输入或一系列由白板图像帧实时序列组成的快照。该视频或快照序列以逐帧为基础基本上进行实时处理。在图 5 示出的示例视频序列中展示了一些选中的帧。有多少序列的帧可以被处理在某种程度上取决于会议服务器 214 的中央处理器（CPU）的利用率。一些（但不是全部）输入帧基于 CPU 利用率用于后续白板背景颜色的处理。用于创建增强白板视频流和白板数据流的前景、笔划计算以及增强处理的实时处理在会议服务器处理带宽受到限制时会比白板背景计算优先进行。

#### 2.2.2 基于单元的运动检测和单元分类

单元分类将单元分成 1) 前景；2) 白板背景或 3) 写在白板上的笔划。实时白板流技术系统和方法从输入图像序列中计算空白的白板颜色。该处理的难点在于整个白板在任意单个帧中可能是不可见的，这主要是由于在白板前的障碍物。因此，白板背景必须通过先将图像帧部分分类成前景或背景来构造。仅有背景部分用于计算白板的背景色。



在根据本发明的一种系统和方法的工作实施例中，前景/背景的判决针对 16X16 像素的图像块进行，该图像块称之为单元。通常，有两种主要直观推断用于执行单元分类中：1) 由于摄像头和白板都是固定的，白板背景单元在这个序列中也是固定的；2) 虽然有时前景对象（例如站在白板前的人）会阻碍白板，但属于白板背景的单元通常是多数。

这样，本发明的一个实施例中，如图 6 所示，输入图像帧单元（处理动作 602）。单元的图像与先前帧的同一单元（例如在同一位置中的单元）的图像进行比较，如在处理动作 604 中所示。在每个帧，所有对于超过 N 帧（在实时白板流技术系统和方法的工作实施例中为 4 帧）都是固定的单元被视作是背景候选者，并馈送给白板颜色模型更新模块（处理动作 610）。如果单元寿命没有超过寿命阈值（在实施例中是 4），该单元就被分类为前景单元，如处理动作 608 所示；而该单元的寿命重置为 1。如果在单元颜色中存在任何显著的差异，该单元分类成前景单元（处理动作 610）。该差异测试是这样的：单元颜色的 Y、U、V 通道必须分别位于白板颜色中它们的对应部分的 15、5 和 5 强度级的范围中。对于前景单元，为了验证这些单元没有被错误分类，还要执行附加测试以判定单元是否和其它前景单元连接（处理动作 612）。如果一组前景单元是孤立的，它们的分类就还原，并且继续分类处理。在本发明一个实施例中的孤立定义为在 5X5 单元的邻域，少于 6 个前景单元。如果所讨论的单元先前并没有由上述的测试确定为前景单元，就判定该单元是否含有边缘，如处理动作 614 所示。如果该单元含有边缘，就将其指派为笔划单元（处理动作 616）。如果不具有边缘，就将其分类为白板背景单元（处理动作 618）。

### 2.2.3 白板颜色估计和白板颜色模型更新

白板颜色模型更新（处理动作 420）寻找白板背景颜色中的逐渐变化。在一般意义上，实时白板流技术系统和方法通过判断每个单元的平均颜色来检测是否存在逐渐变化。如果每个单元的平均颜色几乎与先前相同，就判定逐渐变化发生了。在实施例中的系统也采用了在确定单元是否是背景单元中所使用的相同测试。当记录了逐渐变化时，就更新现有的白板颜色模型而不是

创建新的白板颜色模型。在现有白板颜色模型中仅更新背景单元或笔划单元的颜色模型。前景单元没有被更新。

更具体地说，如图 7 所示，在本发明的一个工作实施例中，白板图像被分成许多单元，如处理动作 702 所示。单元的大小最好大致等于白板上所预期的单个字符的大小（在本发明的实施例是 16X16 像素）。由于墨水吸收了入射光，白板像素的亮度高于笔划像素。在该单元中的白板颜色因而是具有最高亮度的颜色。实际上，在最高的十分之一的像素颜色被平均，以减少传感器噪声所引起的错误。因此，通过先以亮度将（例如  $16 \times 16 = 256$ ）个像素分类，再取最高亮度 10% 的值进行平均以计算每个单元的颜色，如处理动作 706 所示。所得到的单元颜色作为给最小中值平方误差算法（least-median-square error algorithm）的输入，该算法对颜色在全平面（global plane）上拟合，并将含有界外颜色（前景颜色）的单元丢弃，如在处理动作 708 中所示。剩余的单元就被看作是背景单元，并且使用它们的颜色来更新白板背景。为了对被前景对象阻挡的单元所产生的缺口进行填充，具有已知颜色的单元也被扩展到没有颜色的邻近单元。利用在附件 A 中所描述的颜色估计和过滤技术，将这些剩余的单元颜色和先前计算的单元颜色进行整合。

为了执行白板颜色模型的更新，实时白板流技术系统和方法针对背景或笔划采用了较大百分比的原始颜色模型（例如 90%）和较小百分比的新颜色（例如 10%）。

#### 2.2.4 显著的亮度变化

如上所述，考虑了显著的光照变化（处理动作 406）。例如，如果关闭会议室中的一盏灯，几乎所有的给定白板图像中的单元都会变化。如果存在显著的光照变化，基于单元的运动检测（处理动作 404）将报告大多数的单元已经变化（例如，在本发明的实施例中使用 95% 的单元作为阈值来表示光照的显著变化）。随后，重置白板背景，并初始化新的颜色模型或从白板颜色模型数据库中提取新模型。随后，再次开始执行单元分类等处理。

#### 2.2.5 图像增强

白平衡或图像增强的目的在于将输入白板图像转化为在统一背景（通常是白色）上具有相同笔划的图像。对于每个像素，颜色值 $=C_{light}$ ，笔划颜色 $=C_{pen}$ ，而白板背景颜色 $=C_{wb}$ 。由于白板在物理上通常由统一的颜色构成，因此，可以假设 $C_{wb}$ 对于所有像素都是常数。因此，输入图像的缺乏统一性是由于给每个像素的入射光量不同而造成的。因而，白平衡或颜色增强中的第一步处理是估计每个像素的 $C_{light}$ ，其结果实际上是一幅空白白板的图像，如图7所示，处理动作702，并且如前面在白板颜色估计章节所述。

一旦计算了空白白板颜色，就可将其用于使输入视频序列的白板区域统一成白色，而笔划的颜色也能更饱和。如图8所示，一旦计算了空白白板图像（处理动作802），输入图像就通过下述两个步骤进行颜色增强：

1. 使得背景统一成白色（处理动作804）。对于每个单元，经计算的白板颜色（等于入射光 $C_{light}$ ）就用于衡量单元中每个像素的颜色：

$$C_{out} = \min \left( 1, \frac{C_{input}}{C_{light}} \right)$$

2. 减少图像噪声，并增强笔划的颜色饱和度。根据S型曲线： $0.5 - 0.5 \cos(C_{out}^p \pi)$ 来重新映射每个像素每个颜色通道的值。S曲线的斜度由 $p$ 控制。在本发明的工作实施例中， $p$ 设定为0.75（处理动作806）。

### 2.2.6 笔划识别和提取

也提取单元块级别的笔划以作为白板数据流输出。笔划具有下述属性：1）它们是固定的；2）它们具有某些边缘。如图9所示，为了识别边缘和识别直线，对每个输入帧执行两种Sobel滤波 $[-1 \ -2 \ -1; 0 \ 0 \ 0; 1 \ 2 \ 1]$ 和 $[-1 \ 0 \ 1; -2 \ 0 \ 2; -1 \ 0 \ 1]$ （处理动作902到906）。执行第一Sobel滤波以识别水平边缘，而第二Sobel滤波则识别垂直边缘。该处理识别了输入图像中存在的边缘值（edge1）。而边缘值定义为在两个经滤波的图像中对应的像素的绝对值的总和。对于每个单元，它必须对于 $N$ 帧（本发明工作实施例中是4）是固定的，且含有一个边缘值，其值大于阈值（本发明工作实施例中是60），以作为笔划单元。这些笔划单元的边缘值定义了这些笔划的边缘，如处理动作908所示。



### 2.2.7 白板颜色模型匹配

当系统开始运行或检测到光照变化时，就获取 N 帧（例如 4 帧），而在此期间的固定单元的颜色与数据库中每个白板背景图像进行比较。如果固定的单元与数据库中的一个图像的对应单元颜色都匹配（使用 YUV 颜色模型，和对于不同的测试使用 15, 5, 5），就存在一个匹配，系统就用来自匹配的图像的颜色来初始化剩余非固定单元。一旦背景颜色更新过程稳定，就在此对数据库进行匹配。如果不存在匹配，就将当前颜色加入到数据库中。

## 2.3 基于客户机的实时白板流技术系统和方法

如前所述，在会议室中的口头讨论由麦克风捕获，并且该音频（最好和定向信息一起）发送到远程人员。如前所述，增强白板图像流和白板数据流发送给远程参与者。远程参与者可以选择接收一个或另一个或都接收两者实时数据流。

会议中的远程人员通过音频（由会议室中的扬声器播放）和通过注解捕获的白板帧来参与会议。远程参与者的注解可以包括，例如使用鼠标或其它输入设备在白板上加入文本、圆圈定白板上的项目或绘图或作其它标记。远程参与者所作的注解通过网络使用任何适合的实时通信协议来传送给会议服务器并显示。由于白板信息已经驻留，因此，只需要传送注解，而不需要将整个白板图像都传送给会议服务器。这有利于使得传送注解所需的网络带宽很小。

### 2.3.1 给单独显示器的注解

经注解的白板帧显示在会议室的显示器上。该显示器独立于会议室中的实际白板，但含有白板的内容和远程参与者的注解。远程参与者的注解也显示在其他远程人员的桌面上。还可以使用例如蜂鸣器或闪烁屏幕这样的信号来提醒会议参与者和远程参与者，有远程参与者已经向白板内容进行注解。

### 2.3.2 在实际白板上投影注解

或者，远程参与者的注解可以显示在会议室的实际物理白板上。这可以通过将远程客户的注解使用投影仪投射在实际白板上来实现。

#### 2.4 使用平板 PC 注解

在上述方案中，远程参与者采用的是传统的 PC。然而，远程参与者也可以使用平板 PC。微软公司的平板 PC 是针对全配置个人计算机设计的，它允许用户使用输入笔或数字感应触摸屏代替键盘来通过自然手写记录笔记。墨水（ink）技术可以使得远程参与者进行注解（无论是公开的和/或私人的）变得更加容易。

#### 2.5 归档

整个会议（包括注解）都能归档，以便在将来进行查阅。白板和注解作了时间标记，并与音频同步。这样，会议参与者可以在空闲的时间回顾该会议。另外，不能参加会议的人员也可以在随后的时间查阅此次会议。

前面所述的本发明的内容都是为了对本发明进行说明和描述。这些内容并不是要将本发明局限于前面所述的内容中。可以通过上述示例进行修改和变化。

## 附页 A

### 白板颜色估计

为了对在将单元分成前景单元时出现白板颜色缺口进行填充，就使用下述处理来估计要填充这些缺口的颜色。所述处理基于下述两个观察资料：

1) 白板颜色填充随单元的变化而变化，但这种变化并不剧烈。白板颜色具有平滑性和连续性。

2) 由于光照条件在短周期期间通常不会变化，因此，如果没有前景对象，就将白板颜色保持不变。

本处理的目标是从具有变化前景但处于恒定或渐变光照条件的图像序列中估计白板颜色。（当光照条件突然变化，例如关闭或开启一盏灯，的情况已经在 2.2.4 节中描述过了，是通过检测变化并使用多个颜色模型来处理）。恒定或渐变光照条件的假设是指每个白板像素的颜色只能随时间在限定范围内变化，并且，在本发明的一个实施例中，这种变化已经模型化为用零平均值和小标准偏差的随机处理。还假设相邻像素之间的白板反射率属性是类似的，这意味着相邻像素之间的白板颜色只能在限定范围内变化，并且，在本发明的一个实施例中，这种假设模型化为 Markov 随机场，因此，在一个像素的白板颜色仅由相邻像素制约。该估计处理包括下述步骤：

1. 初始化。白板颜色需要初始化。这可以通过多种方法来实现。一种方法是通过利用邻近平滑度约束仅从一个图像来估计白板颜色。每个像素的颜色估计与协方差矩阵相关联，该矩阵表示了这种估计的精度。

2. 颜色匹配。给出一个输入图像，对每个像素将期待的白板颜色 and 实际观测的颜色进行比较。如果它们差异巨大，所观测的像素不是笔划的一部分就是前景对象的一部分，并且在下一步骤将丢弃该像素的颜色；否则，该像素的颜色就是白板颜色的观测值，并在更新白板颜色中使用。

3. 颜色更新。将输入图像中有效的白板颜色像素在概率性框架（probabilistic framework）下用于更新白板颜色。每个像素的白板颜色改变多少取决于当前所观测像素相对于所估计颜色来说有多可靠，当前所观测像素对于所估计颜色来说有多大不同，以及所观测颜色与相邻像素中的颜色

有多大不同。每个像素颜色估计的协方差矩阵也会相应更新。

步骤 2 和 3 针对每个输入图像进行重复。

为了减少计算的复杂性并考虑到白板颜色实际上在空间上变化非常缓慢，白板区域可以分成一组小单元，而可以以每个单元（不是每个像素）为基础来估计白板颜色。更具体地说，估计白板颜色的数学细节将在下面的章节说明。

#### A.1 目标

该处理的目标是从图像系列中实时动态估计白板颜色。在此假设亮度随时间是恒定的。（当光照突然变化，例如当关闭一盏灯，就需要使用多个白板颜色模型）

#### A.2 表示

参照图 A-1，状态变量  $x_{i,j}$  是要估计的每个单元  $(i, j)$  白板的颜色。观察变量  $z_{i,j}$  是从图像观测的每个单元  $(i, j)$  处的白板的颜色，该变量可以通过例如直方图（histogramming）来计算。

#### A.3 问题陈述

给出：

- 在时间  $t-1$ ，状态： $\hat{x}_{i,j}^{t-1}$ ；协方差矩阵： $\hat{P}_{i,j}^{t-1}$ ；
- 状态变换： $x'_{i,j} = x_{i,j}^{t-1} + \eta'_{i,j}$ ，即对于随机变量  $\eta'_{i,j} \sim N(0, R'_{i,j})$ （即以 0 为中心具有协方差矩阵  $R'_{i,j}$  的正态/高斯分布）恒定；
- 在时间  $t$ ，观察： $z'_{i,j} = x'_{i,j} + \zeta'_{i,j}$ ，其中观察噪声  $\zeta'_{i,j} \sim N(0, Q'_{i,j})$ ；在  $t$  时的估计状态： $\hat{x}'_{i,j}$ ；协方差矩阵  $\hat{P}'_{i,j}$ ，这是在  $\hat{x}'_{i,j}$  需要在空间上非常平滑作为限制条件下。

#### A.4 平滑度

人们可以使用 4 或 8 个邻域来如下建立平滑度模型：

$$(x'_{i,j} - x'_{k,l}) \sim N(0, S'_{i,j})$$

其中,  $k \in [i-1, i+1]$ , 而  $l \in [j-1, j+1]$ , 并且  $(k, l) \neq (i, j)$ 。

在  $t$  时间的状态预测如下:

$$x_{i,j}^{t|t-1} = E[x_{i,j}^{t-1} + \eta_{i,j}^t] = \hat{x}_{i,j}^{t-1}$$

$$\hat{P}_{i,j}^{t|t-1} = V[x_{i,j}^{t-1} + \eta_{i,j}^t] = \hat{P}_{i,j}^{t-1} + R_{i,j}^t$$

#### A. 4 目标函数

随后给出试图最小化的总体能量:

$$F = \sum_{i,j} \{ (x_{i,j}^t - \hat{x}_{i,j}^{t|t-1})^T (\hat{P}_{i,j}^{t|t-1})^{-1} (x_{i,j}^t - \hat{x}_{i,j}^{t|t-1}) + (x_{i,j}^t - z_{i,j}^t)^T (Q_{i,j}^t)^{-1} (x_{i,j}^t - z_{i,j}^t) \}$$

$$\frac{1}{\Omega} \sum_{(k,l) \in \Omega(i,j)} \{ (x_{i,j}^t - x_{k,l}^t)^T (S_{i,j}^t)^{-1} (x_{i,j}^t - x_{k,l}^t) + (x_{i,j}^t - z_{i,j}^t)^T \}$$

其中  $\Omega$  是邻域的数目。这三个项分别是预测、观察和邻域的差异。所有的差异是统计距离, 并由协方差矩阵归一化。

#### A. 6 解答

对于  $\hat{x}_{i,j}^t$  到 0 设定  $F$  的偏导数, 产生:

$$(\hat{P}_{i,j}^{t|t-1})^{-1} (x_{i,j}^t - \hat{x}_{i,j}^{t|t-1}) + (Q_{i,j}^t)^{-1} (x_{i,j}^t - z_{i,j}^t) + (S_{i,j}^t)^{-1} (x_{i,j}^t - \bar{x}_{i,j}^t) = 0$$

其中  $\bar{x}_{i,j}^t$  是邻域中状态的平均值, 即:

$$\bar{x}_{i,j}^t = \frac{1}{\Omega} \sum_{(k,l) \in \Omega(i,j)} x_{k,l}^t$$

这给出了下列解答:

$$x_{i,j}^t = ((\hat{P}_{i,j}^{t|t-1})^{-1} + (Q_{i,j}^t)^{-1} + (S_{i,j}^t)^{-1})^{-1} (\hat{P}_{i,j}^{t|t-1})^{-1} \hat{x}_{i,j}^{t|t-1} + (Q_{i,j}^t)^{-1} z_{i,j}^t + (S_{i,j}^t)^{-1} \bar{x}_{i,j}^t$$

不幸地是, 右侧的  $\bar{x}_{i,j}^t$  涉及到未知的  $x_{k,l}^t$ 。因此, 为了解决相互依赖的问题, 使用了下述迭代处理: 对于第一次迭代, 使用预期平均值,  $\frac{1}{\Omega} \sum_{(k,l) \in \Omega(i,j)} x_{k,l}^{t|t-1}$ , 作为  $\bar{x}_{i,j}^t$ ; 并且在随后的迭代中, 我们采用来自先前迭代的估计平均值。注意, 这种迭代处理是非常有效的, 因为迭代之间唯一的修改就在于  $\bar{x}_{i,j}^t$ ; 其它的都能被高速缓冲。同样, 给出如下  $x_{i,j}^t$  的协方差:

$$P_{i,j}^t = ((\hat{P}_{i,j}^{t|t-1})^{-1} + (Q_{i,j}^t)^{-1} + (S_{i,j}^t)^{-1})^{-1} (2I + (S_{i,j}^t)^{-1} \bar{P}_{i,j}^t)$$

其中  $I$  是单位矩阵, 并且

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$$\bar{P}'_{i,j} = \frac{1}{\Omega} \sum_{(k,l) \in (i,j)} P'_{k,l}$$

再次使用迭代过程，将预测平均值  $\frac{1}{\Omega} \sum_{(k,l) \in (i,j)} \hat{P}^{n-1}_{k,l}$  作为第一迭代中的  $\bar{P}'_{i,j}$ 。

#### A.7 实际考虑事项

在实现时，需要注意下述问题：

- 观测协方差  $Q'_{i,j}$ 。它应该包括传感器噪声和判决的不肯定性。判决的不肯定性是我们认为  $z'_{i,j}$  是白板颜色的有多少可信度的倒数。如果是界外值，就设定  $Q'_{i,j} = \infty$ （无限值）。
- 状态转换噪声  $\eta'_{i,j}$  和它的协方差矩阵  $R'_{i,j}$ 。这用于说明由于灯或日光引起的光照中的小变化。（巨大的变化例如当关闭一盏灯时需要考虑使用多个模型。）
- 平滑度协方差矩阵  $S'_{i,j}$ 。它应该比协方差  $\hat{P}^{n-1}_{k,l}$  的当前估值和理想情况下期望的变量之和要小。如果期望的变量为每颜色通道 5 个强度级，就可使用  $S'_{i,j} = \hat{P}^{n-1}_{k,l} + 5^2 I$ 。

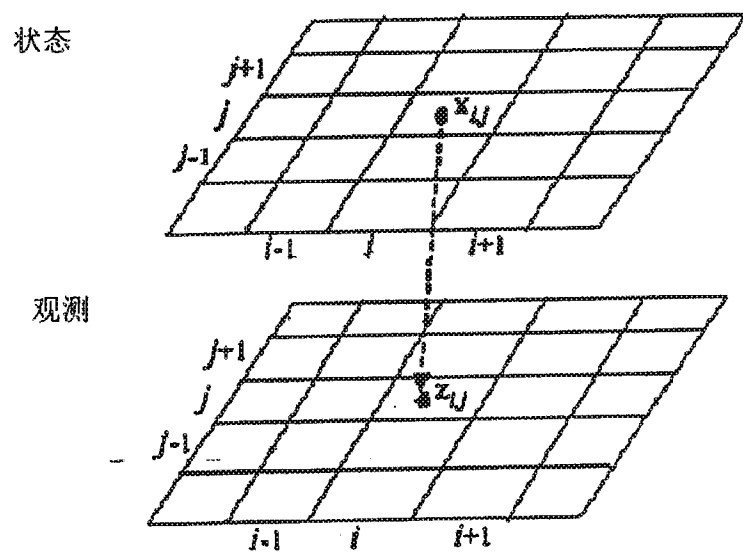


图 A1

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说明书附图 第2/10页

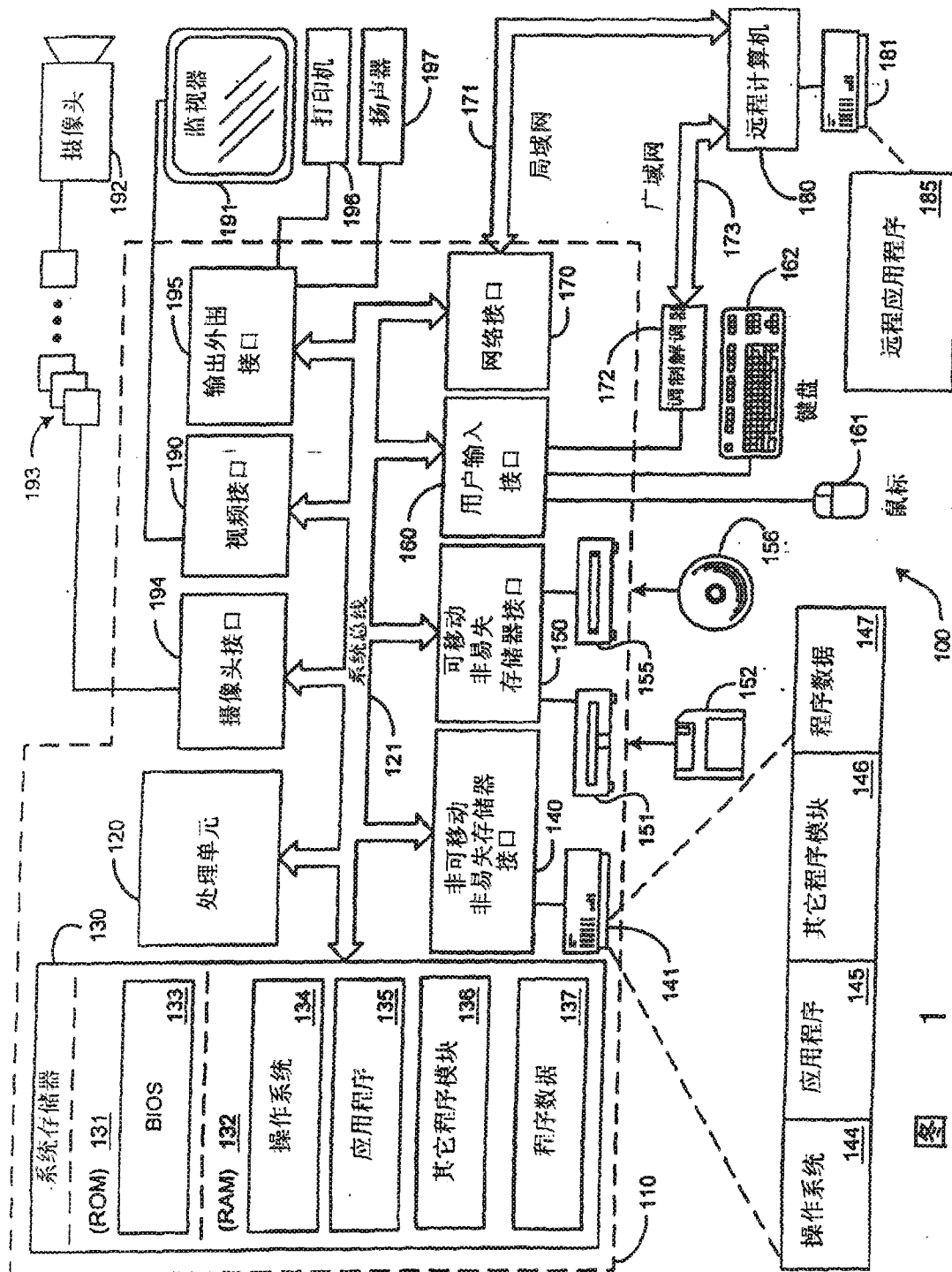


图 1



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说明书附图 第3/10页

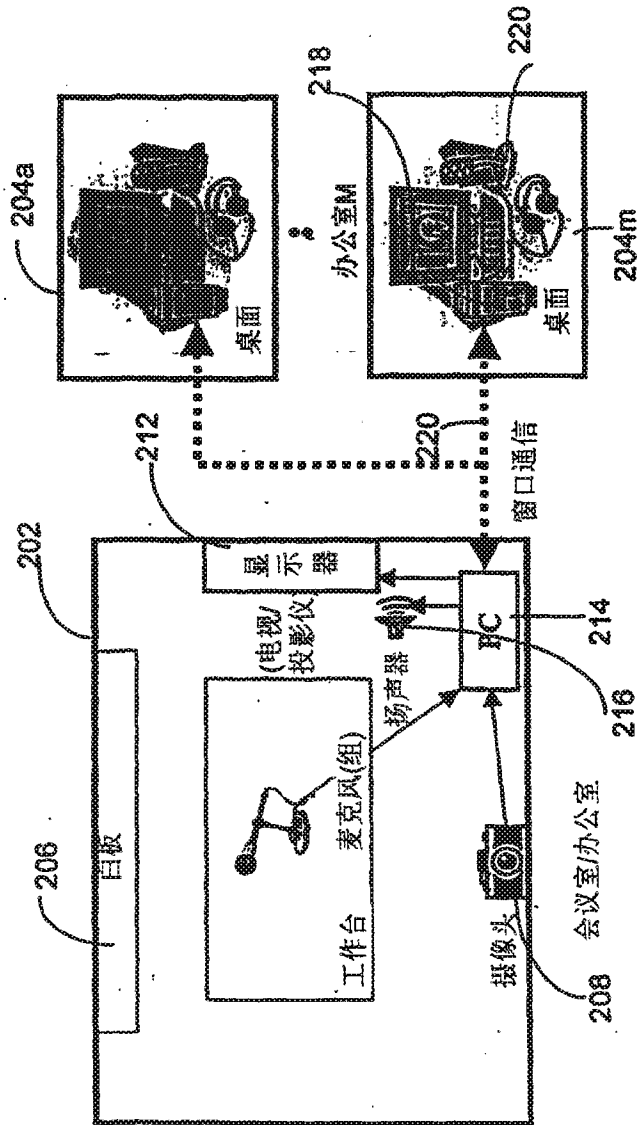
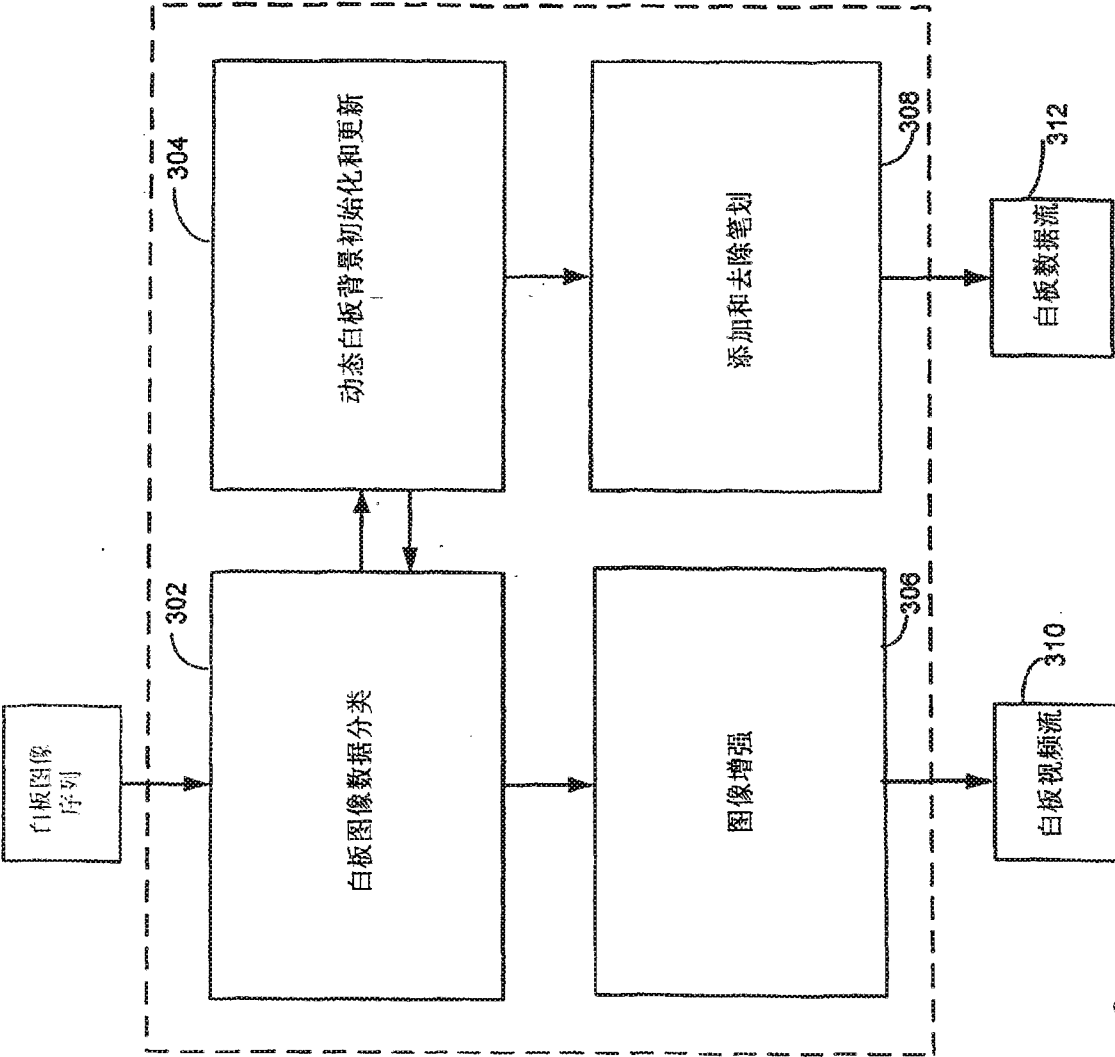


图 2

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说明书附图 第4/10页



3



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说明书附图 第5/10页

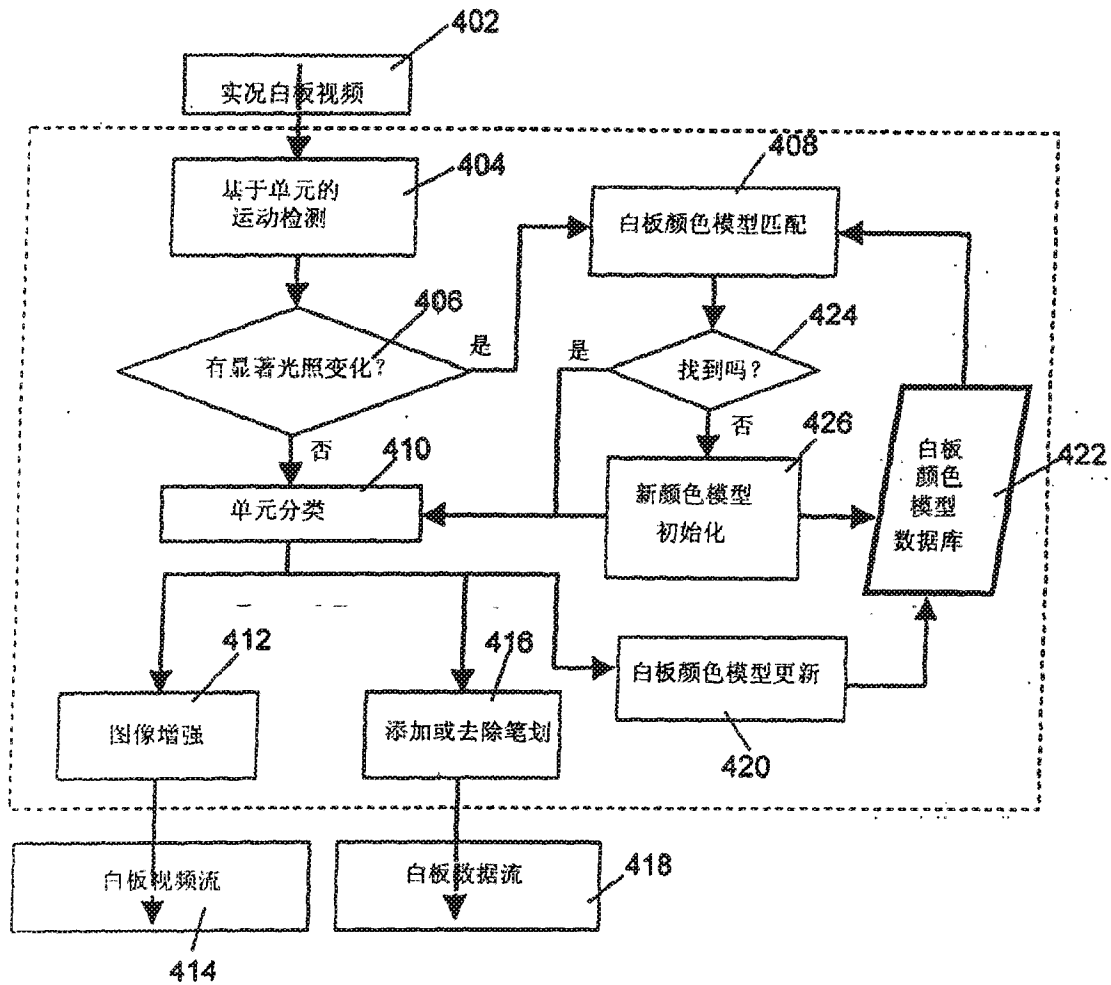
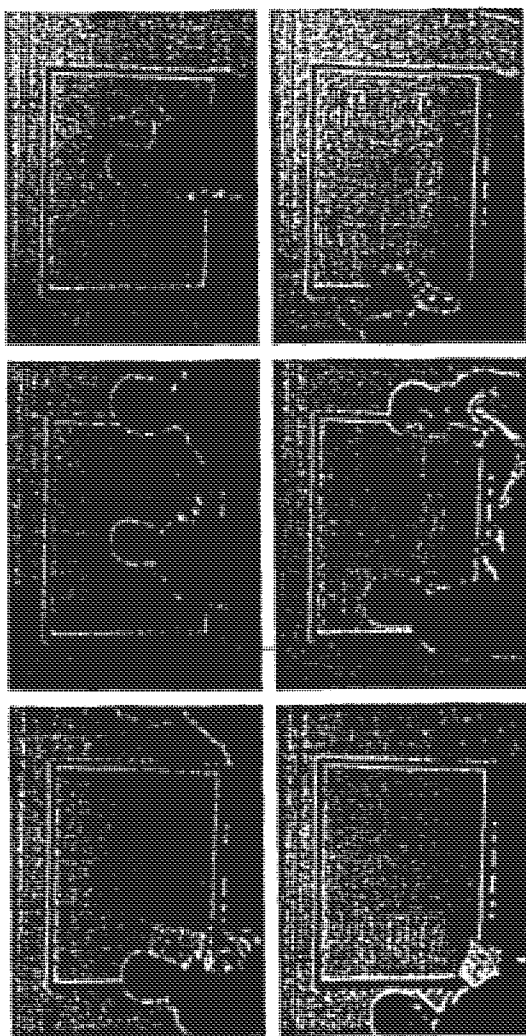


图 4

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说明书附图 第6/10页



5



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说明书附图 第7/10页

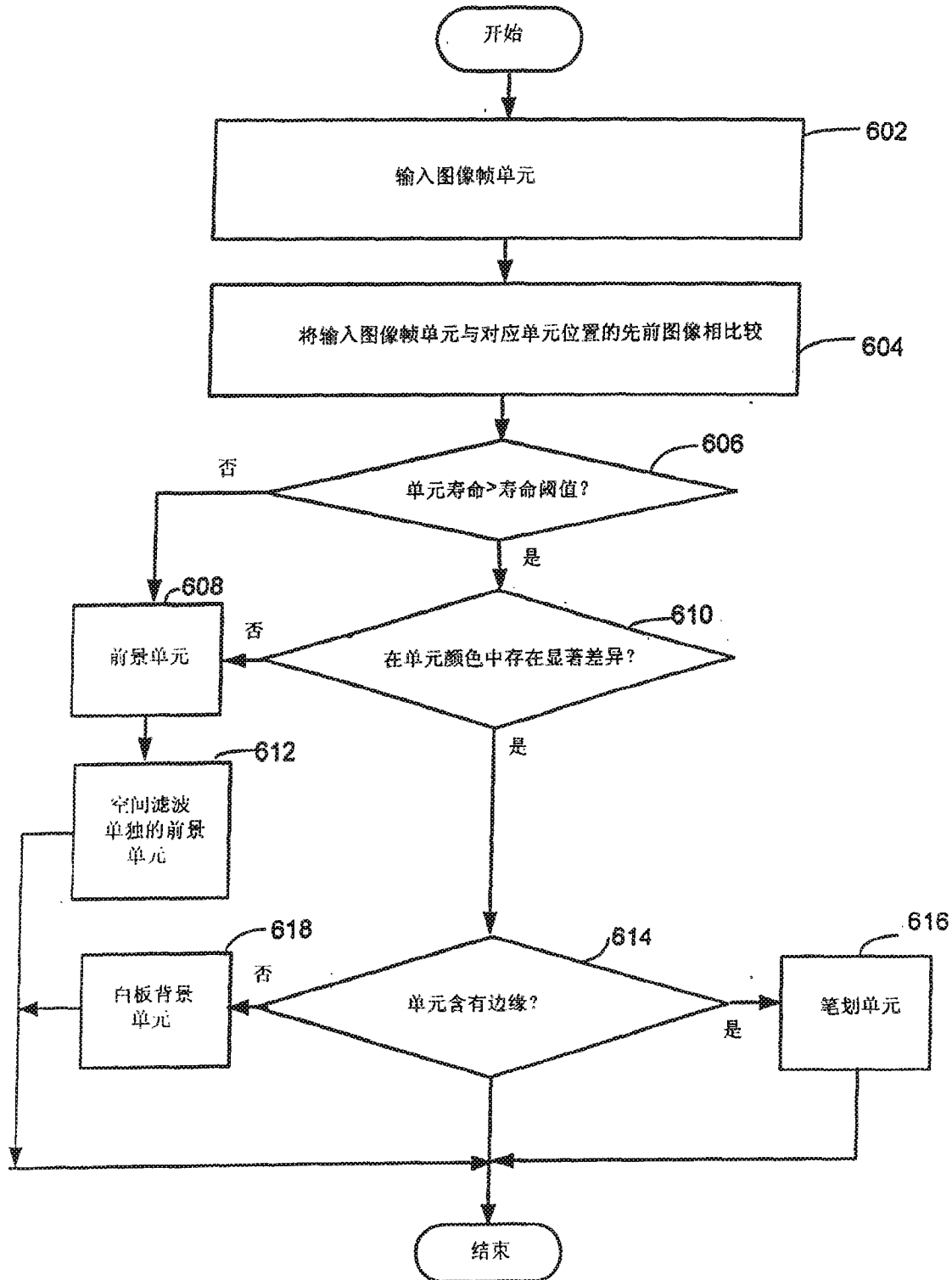


图 6

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说明书附图 第8/10页

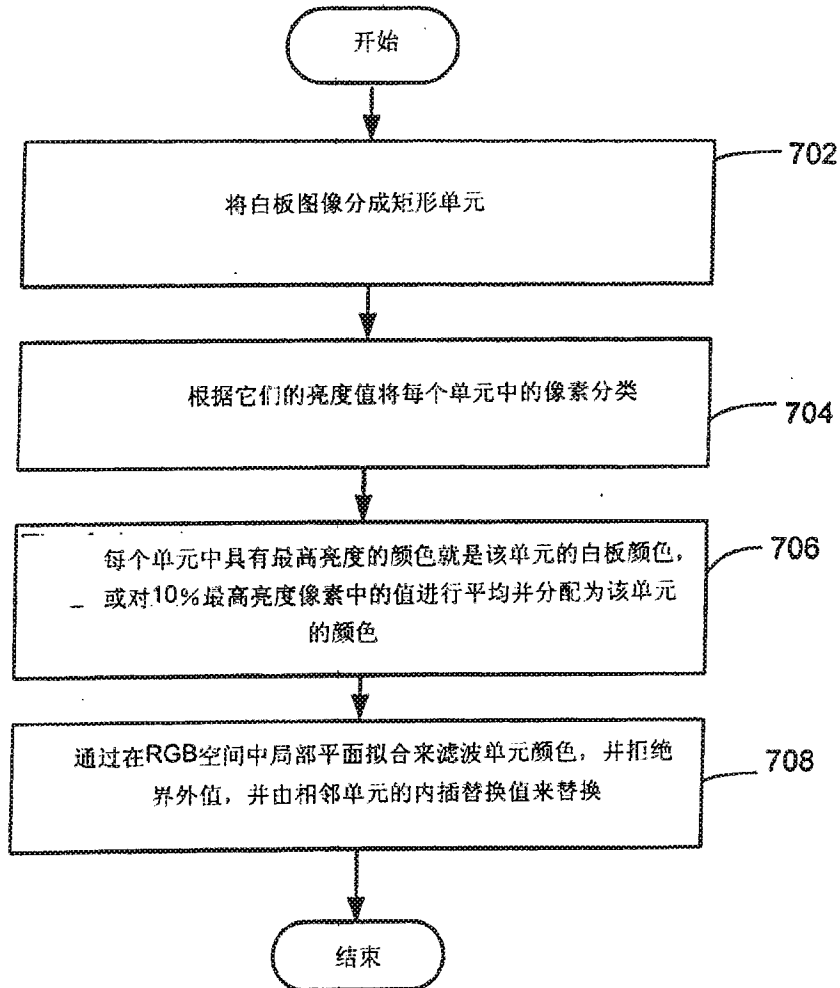


图 7

200410007618.7

说明书附图 第9/10页

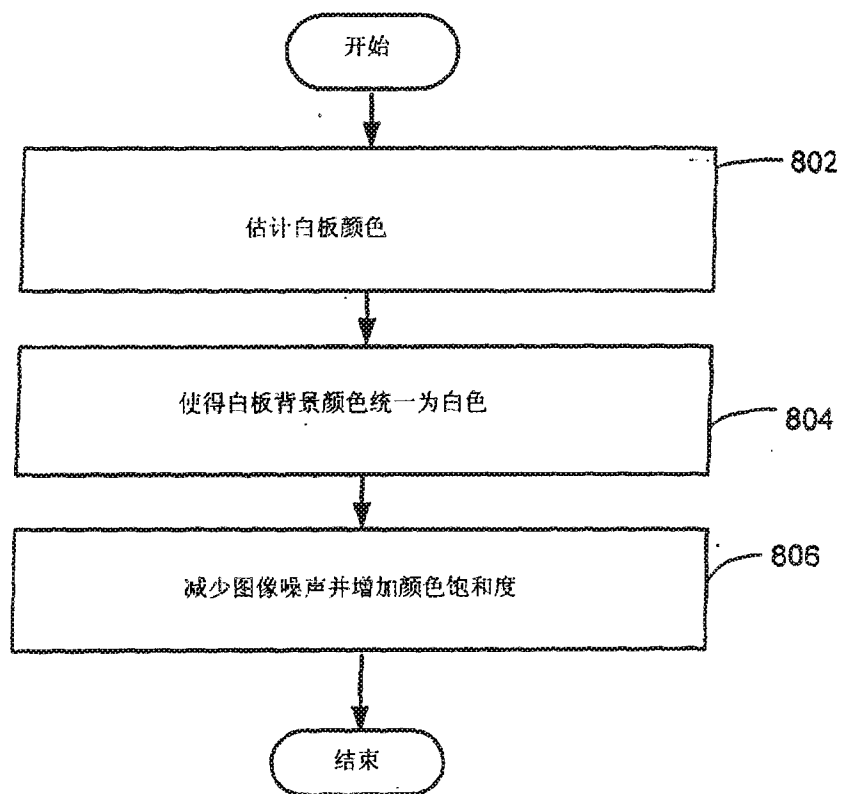


图 8

200410007618.7

说明书附图 第10/10页

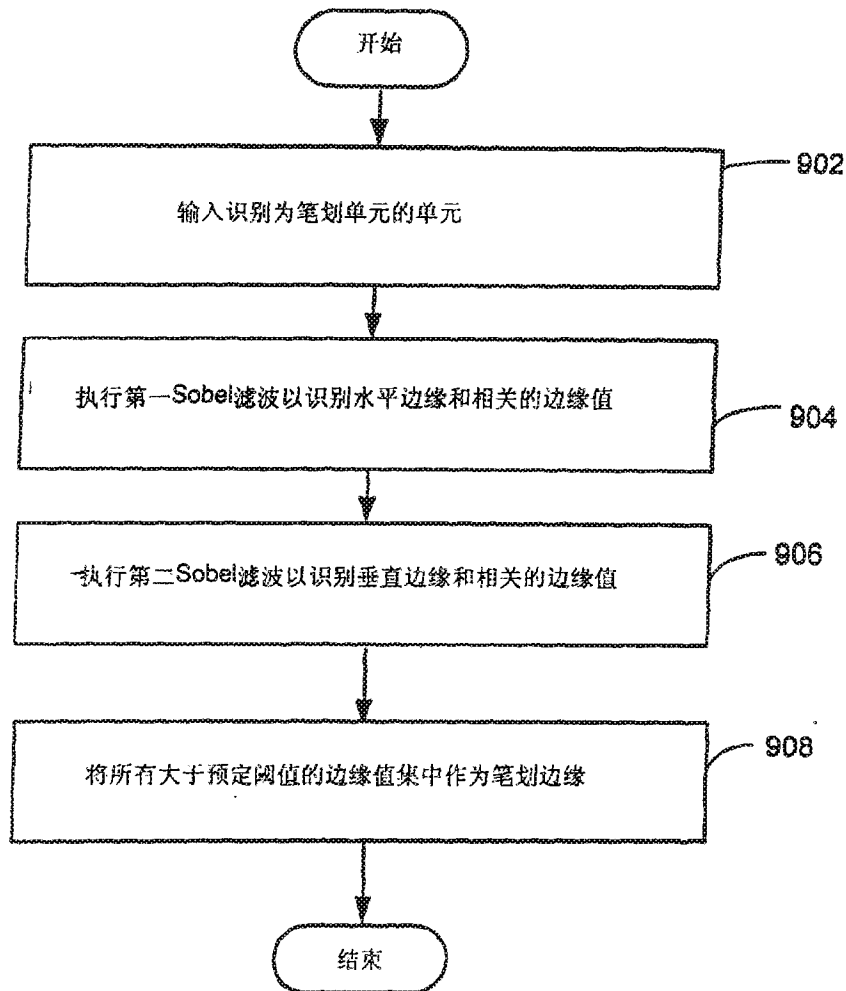
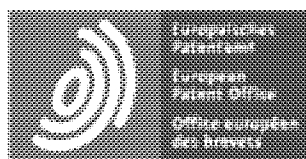


图 9





## Espacenet

CN1555197A Video frequency meeting shared white plate realizing method based on Internet

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Video frequency meeting shared white plate realizing method based on Internet

### Abstract

A realization method for TV conference shared white panel based on Internet includes: a. A client sends a connection request to a server which generates SK answering the said required client and joins it in the tail of a chained list, b. The client draws on its plate and carries out vector sequential process to the drawings to be sent to Internet via its SK port, C. After receiving the said upbound data, the server reproduces the drawing on its plate by counter-sequential process and reviews the said chained list to transfer the data to all the shared clients via related SK ports. d. The shared client receives the said data and reproduces the drawings on the plate by counter-sequential process.

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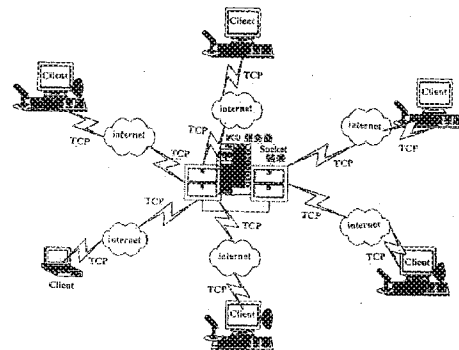
代理人 王锁林

权利要求书 3 页 说明书 10 页 附图 3 页

[54] 发明名称 基于 Internet 的视频会议共享白板实现方法

### [57] 摘要

一种基于 Internet 的视频会议共享白板实现方法, 包括: a. 客户机向服务器发连接请求, 服务器产生响应该请求客户机的套接字, 将套接字加入链表的尾部; b. 客户机在其画板上绘制图形, 将所绘图形进行矢量序列化处理, 通过其套接字端口发送到 Internet 上; c. 服务器接收到上传的所述数据后, 通过反序列化处理将图形再现于它的画板上; 同时遍历所述链表, 将所述数据通过相应的套接字端口转发给所有共享客户机; d. 共享客户机接收所述数据, 通过反序列化处理将图形再现于画板上。本发明实现了白板图形在互联网上高速可靠传输, 具有多种绘图工具, 避免了传统系统占用频带宽、设备昂贵、升级不便、运营费用高的缺点。



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1、一种基于 Internet 的视频会议共享白板实现方法，其特征在于包括以下步骤：

a、启动安装于服务器和客户机中的白板系统，在服务器和客户机的显示屏上出现画板、绘图工具栏和控制面板，客户机登录所述服务器，并向服务器发出连接请求，服务器接受客户机的连接请求，同时产生一个响应该请求客户机的套接字，并将套接字加入套接字链表的尾部；

b、客户机在其画板上绘制一个或几个图形，将所绘图形进行矢量序列化处理、存档，最后通过其套接字端口发送到 Internet 上；

c、所述服务器通过其套接字端口侦听、接收到客户机上传的图形序列化数据后，首先进行存档，并记录接收顺序，然后通过反序列化处理将图形再现于服务器的画板上；

同时，所述服务器遍历套接字链表，将所述图形序列化数据通过相应的套接字端口转发给所有参加会议的客户机；

d、所有登录的客户机接收到图形序列化数据后，通过反序列化处理将图形再现于各自的画板上。

2、根据权利要求 1 所述的基于 Internet 的视频会议共享白板实现方法，其特征在于，在步骤 b 中，客户机将其画板上绘制的图形进行矢量序列化处理的方法如下：

- ①、客户机对应于白板系统的每一种绘图工具，创建一个数组；
- ②、将各绘图工具所绘图形元素的特征值添加到对应的数组中；
- ③、将各数组的数组元素按指定顺序序列化。

3、根据权利要求1所述的基于 Internet 的视频会议共享白板实现方法，其特征在于：在步骤 c 中，服务器将图形序列化数据进行反序列化处理的步骤如下：

①、服务器对应于白板系统的每一种绘图工具，创建一个数组；

②、从收到的图形序列化数据中找出当前绘图工具名字信息，从而确定使用的绘图工具；

③、根据所确定的绘图工具，并按照图形序列化数据中对应的图形元素的特征值创建图形元素，同时将该图形元素加入服务器白板系统的相应数组中。

4、根据权利要求1所述的基于 Internet 的视频会议共享白板实现方法，其特征在于：在步骤 d 中，登录的客户机对接收的图形序列化数据进行反序列化处理的步骤如下：

①、客户机对应于白板系统的每一种绘图工具，创建一个数组；

②、从收到的图形序列化数据中找出当前绘图工具名字信息，从而确定使用的绘图工具；

③、根据所确定的绘图工具，并按照图形序列化数据中对应的图形元素的特征值创建图形元素，同时将该图形元素加入客户机白板系统的相应数组中。

5、根据权利要求1所述的基于 Internet 的视频会议共享白板实现方法，其特征在于：客户机之白板系统记录有绘图的顺序，能够进行回撤和恢复操作。

6、根据权利要求1所述的基于 Internet 的视频会议共享白板的方法，其特征在于：客户机在其画板上绘制椭圆形的步骤是，在画板上先取两点，

确定横轴的半径及角度，再取第三点，确定椭圆纵轴的半径。

7、根据权利要求1所述的基于 Internet 的视频会议共享白板的方法，其特征在于：客户机在其画板上绘制画笔轨迹曲线的步骤是，设置一个记录轨迹曲线的点的链表，当画笔在画板上移动时，不断发送轨迹点的数据，将轨迹点的数据不断加入链表中，同时在相邻两点间画直线，将轨迹显示出来。

8、根据权利要求1所述的基于 Internet 的视频会议共享白板的方法，其特征在于：所述绘图工具栏包含直线、矩形、圆角矩形、多边形、椭圆形、圆形、画笔轨迹曲线、内切椭圆、圆弧、椭圆弧、贝赛尔曲线以及文字输入工具。

9、根据权利要求1所述的基于 Internet 的视频会议共享白板实现方法，其特征在于：所述控制面板包括画笔、画刷、背景的颜色设置和风格设置。

10、根据权利要求9所述的基于 Internet 的视频会议共享白板实现方法，其特征在于：所述背景的颜色设置采用滑杆条取色。

## 基于 Internet 的视频会议共享白板实现方法

### 技术领域

本发明涉及视频会议系统技术，具体是一种基于 Internet 的视频会议共享白板实现方法。

### 背景技术

面对面的交谈是人类表达思想最丰富的一种方式，人们会充分调动眼睛、表情和动作来渲染话语。对于商业事务来说，电话交谈无法表达图表、文件、数据表格之类有说服力和感染力的东西。一个企业或团体需要召开会议时，经常遇到其各个部门或人员无法集中的情况（甚至分布在世界各地）。对此，人们提出了利用通信媒体开视频会议的需求。所谓视频会议，就是利用通信线路把两个或多个会议室连接起来，以电视方式召开会议的一种图像通信手段。视频会议的主要特征是能实时传送与会者的形象、声音以及会议资料图表和相关事物的图像等，身居不同地点的与会者可以闻声见影，如同坐在同一间会议室中开会一样。

目前的视频会议系统大都采用模拟方式传输图像，由于占用频带宽，设备昂贵（需要很多专有硬件设备），升级不便，运营费用很高，难以普及。

数字式视频和音频技术的进步导致了计算机和网络的革命，并为计算机系统的应用开拓了新的设计空间。高速网络技术、分布式处理技术、多媒体信息处理技术、多媒体工作站技术等的进步为分布式多媒体系统的发展奠定了基础。美国 In-Stat/MDR 公布的关于视频会议系统的调查结果显

示，到 2006 年为止，视频会议系统的全球市场将从 2001 年的 7 亿 7200 万美元增长为 22 亿美元的规模。

目前数字视频会议的研究主要集中于 LAN 和 ATM 网。带宽在视频会议应用中是一个比较大的问题。LAN 通常能提供足够带宽，因而不存在带宽问题，而 Internet 就不一样了。如今的企业 LAN 和 ATM 网已能提供足够带宽，并具备相关 QoS 控制机制，而对基于 Internet 的视频会议应用来说，这些因素往往是不可预知的。对于 LAN 视频会议白板系统来说，图形可以位图方式保存并传输，但在 Internet 上，通信量在一天中的不同时段变化很大，因此需要引入某种通信压缩机制，以降低视频会议的带宽需求。

### 发明内容

为了克服现有技术存在的上述不足，本发明提供一种基于 Internet 的视频会议共享白板实现方法，以满足数字视频会议系统的市场需求。

本发明基于 Internet 的视频会议共享白板实现方法，包括以下步骤：

a、启动安装于服务器和客户机中的白板系统，在服务器和客户机的显示屏上出现画板、绘图工具栏和控制面板，客户机登录所述服务器，并向服务器发出连接请求，服务器接受客户机的连接请求，同时产生一个响应该请求客户机的套接字，并将套接字加入套接字链表的尾部；

b、客户机在其画板上绘制一个或几个图形，将所绘图形进行矢量序列化处理，存档，最后通过其套接字端口发送到 Internet 上；

c、所述服务器通过其套接字端口侦听、接收到客户机上传的图形序列化数据后，首先进行存档，并记录接收顺序，然后通过反序列化处理将图形再现于它的画板上；

同时所述服务器遍历（即依次轮流查询）套接字链表，将图形序列化



数据通过相应的套接字端口转发给所有参加会议的客户机；

d、所有登录的客户机接收到图形序列化数据后，通过反序列化处理将图形再现于各自的画板上，从而实现共享白板的目的。

在步骤 b 中，客户机将其画板上绘制的图形进行矢量序列化处理的方法如下：

- ①、客户机对应于白板系统的每一种绘图工具，创建一个数组；
- ②、将采用各绘图工具所绘图形元素的特征值添加到对应的数组中；
- ③、将各数组的数组元素按指定顺序序列化，形成图形序列化数据。

在步骤 c 中，服务器将图形序列化数据进行反序列化处理的步骤如下：

- ①、服务器对应于白板系统的每一种绘图工具，创建一个数组；
- ②、从收到的图形序列化数据中找出当前绘图工具名字信息，从而确定使用的绘图工具；

③、根据所确定的绘图工具，并按照图形序列化数据中对应的图形元素的特征值创建图形元素，同时将该图形元素加入服务器白板系统的相应数组中。

在步骤 d 中，客户机对接收的图形序列化数据进行反序列化处理的步骤如下：

- ①、客户机对应于白板系统的每一种绘图工具，创建一个数组；
- ②、从收到的图形序列化数据中找出当前绘图工具名字信息，从而确定使用的绘图工具；

③、根据所确定的绘图工具，并按照图形序列化数据中对应的图形元素的特征值创建图形元素，同时将该图形元素加入客户机白板系统的相应数组中。



本发明使数字视频会议系统的白板图形可以在 Internet 上高速可靠传输，从而实现基于 Internet 的数字视频会议系统，克服了传统视频会议系统占用频带宽、设备昂贵、升级不便、运营费用高的缺点。

具有多种绘图工具和用于设置画笔、画刷、背景的风格及颜色的控制面板，通过 TrackBar 滑杆条微调颜色，画笔不但可以设置线宽，而且可以设置为多种虚线。不但可以设置实心或空心两种画刷，还可以设置阴影画刷，而且有 6 种阴影图形可供选择，可以选择背景模式，极大地丰富了白板的表現能力。

本系统记录绘图的顺序，可以实现回撤和恢复操作，在错误绘图时和实验绘图时，能够方便地修改。

#### 附图说明

图 1 为本发明一典型实施案例的系统结构图；

图 2 为其白板图形的传输流程图；

图 3 为其绘图工具栏的示意图；

图 4 为其控制面板的示意图。

#### 具体实施方式

下面结合附图进一步说明。

图 1 为本发明一典型实施案例的系统结构图，本实施案例由一台服务器和若干台客户机共同构成，系统采用星型的 Client/Server 结构和 TCP 传输协议，服务器和客户机之间通过套接字进行通信。本实施案例的具体配置如下：

服务器配置：

CPU: Intel P4 1.4GHz

内存：256M

操作系统：Windows 2000 Server

客户端配置：

CPU: Intel PIII 800MHz

内存：256M

操作系统：Windows 2000 Professional

参照图 1、图 2 说明本发明基于 Internet 的视频会议共享白板实现过程：

1、首先启动服务器，使之处于监听状态。客户机后启动，登录服务器，向服务器发出连接请求。服务器接受客户机的连接请求，同时创建一个新的套接字（socket + port），专门对应客户机套接字的连接，这样就在两者之间建立了一对可相互通信的套接字。

由于服务器与客户机之间是一对多的星型连接结构，服务器产生多个套接字与多个客户机一一对应，服务器设置了一个套接字链表来管理这些套接字。每当一个客户机发出连接请求时，服务器接受其请求，产生一个新套接字，同时将这个套接字加入套接字链表的尾部。

2、客户机在其画板上可绘制一个或几个图形，将所绘图形进行矢量序列化处理，存档，最后通过其套接字端口通过 Internet 发送给服务器；

3、所述服务器通过其套接字端口侦听、接收到客户机上传的图形序列化数据后，首先进行存档，并记录接收顺序，然后通过反序列化处理将图形再现于它的画板上；并且遍历记录着连接关系的套接字链表，将图形序列化数据通过相应的套接字端口一一转发给所有参加会议的客户机。

4、所有参加会议的客户机接收到服务器转发的图形序列化数据后，通过反序列化处理将图形再现于各自的画板上，这样就实现了绘制图形元素

的共享。

本发明在客户端启动后，出现画板，在画板的旁边显示 12 种绘图工具的工具栏（见图 3），以及设置画笔、画刷、背景风格的控制面板（见图 4）。工具栏的 12 种绘图工具按次序依次是：直线、矩形、圆角矩形、多边形、椭圆、圆、画笔轨迹曲线、内切椭圆、圆弧、椭圆弧、贝赛尔曲线以及文字输入，另外三个按钮是：选择和移动图形元素、取消对绘图工具的选择、关闭绘图工具框。

如果服务器已先启动，正在监听，客户端可以向服务器程序发出连接申请。点击主工具栏的连接图标。如果服务器没有启动，客户端连接不成功，提示，等待再次连接。选择“是”，再次尝试连接；选择“否”，取消连接申请。如果已经和服务器连接，要断开这个连接，选择主工具栏的断接图标点击，完成断开操作。

客户端选择某一绘图工具后，就可以在画板中画出相应图形。将其画板上绘制的图形进行矢量序列化处理。矢量序列化处理过程为：①、对应于白板系统的 12 种绘图工具，创建 12 个数组；②、将各绘图工具所绘图形元素的特征值添加到对应的数组中；③、将各数组的数组元素按指定顺序序列化。

绘制的图形通过序列化（Serialize）保存，序列化按照属性顺序保存数据特征值，（相当于一种压缩方式，）所以通过 Serialize 保存的数据文件，占用磁盘空间很小，读写很快。例如本程序的画板文件，一般不超过 100K，如果保存为.bmp 格式文件，需要 n M 的空间。序列化后的图形数据通过套接字端口传到网络上并发往服务器。

本发明在服务器端实现了文档类的序列化，它由多达 12 种图形元素的

序列化组成。在整个白板中，每种图形元素的数量可能从 0 到任意多个。  
对应每种图形元素，使用了一个数组进行管理。共 12 个数组，每个数组中有 0 到任意多个元素。

服务器通过其套接字端口侦听、接收到客户机上传的图形序列化数据后，首先进行存档，并记录接收顺序，然后通过反序列化处理将图形再现于它的画板上。服务器将图形序列化数据进行反序列化处理的步骤如下：

①、服务器对应于白板系统的每一种绘图工具，创建一个数组，共 12 个数组；

②、从收到的图形序列化数据中找出当前绘图工具名字信息，从而确定上传请求的客户端使用的绘图工具；

③、根据所确定的绘图工具，并按照图形序列化数据中对应的图形元素的特征值创建相应的图形元素，同时将该图形元素加入服务器白板系统的相应数组中。

服务器在接收到客户绘图的同时，将这个图形元素转发给其它的共享客户。服务器中保存有一个套接字链表，记录着和客户端的所有连接。服务器遍历这个套接字链表，将图元元素转发给其它客户端，转发通过套接字端口完成。

本发明在服务器端实现了系统托盘功能。白板服务器正常启动后，将在系统托盘中显示一个小图标。实现系统托盘功能，分 5 步执行：

- 1) 建立一个处理托盘通知消息的窗口对象
- 2) 建立一个结构体
- 3) 建立相应的托盘通知消息映射机制
- 4) 调用脚本方法

5) 在窗口对象中编写事件响应方法。

在共享的客户端也通过套接字端口接收服务器转发来的上述图形序列化数据，对接收的图形序列化数据进行如下反序列化处理，①、对应于白板系统的每一种绘图工具，创建一个数组；②、从收到的图形序列化数据中找出当前绘图工具名字信息，从而确定使用的绘图工具；③、根据所确定的绘图工具，并按照图形序列化数据中对应的图形元素的特征值创建图形元素，同时将该图形元素加入共享的客户机白板系统的相应数组中。

然后采用循环遍历的方法将各图形数组中的元素一个不漏地显示出来。

如图 3 所示绘图工具栏中的按钮从左到右依次为：直线、矩形、圆角矩形、多边形、椭圆形、圆形、画笔轨迹曲线、内切椭圆、圆弧、椭圆弧、贝赛尔曲线和文字输入 12 种绘图工具，另外三个按钮是：选择和移动图形元素、取消对绘图工具的选择、关闭绘图工具框。所述 12 种绘图工具的具体实现原理如下：

直线：在画板上取 2 个点，在两点间绘制一条直线。

矩形：在画板上取 2 个点，以两点为对角线，绘制一个矩形。

圆角矩形：在画板上取 2 个点，以两点为对角线，绘制一个圆角矩形。

多边形：利用链表记录绘图过程中所取的各点，这些点是多边形的顶点。在相邻点之间绘制直线，就完成了多边形的绘制。

椭圆形：在画板上取 3 个点，确定椭圆长短轴半径。这种方法可以绘制倾斜的椭圆，比内切法灵活。先取两点，确定横轴的半径及角度，再取第三点，确定椭圆纵轴的半径。椭圆的中心为前两点的中点。

圆形：在画板上取两个点，调用绘内切椭圆的方法，从中心点向左上和右下偏移相等的距离。这个距离等于所取的两点间的距离，即圆的半径。

画笔轨迹曲线：系统设置一个记录轨迹曲线的点的链表，当画笔在画板上移动时，不断发送轨迹点的数据，将轨迹点的数据不断加入链表中，同时在相邻两点间画直线，将轨迹显示出来。系统封装了一个绘制直线的方法，在相邻两点间画直线。由于两点间的直线很细小，不会影响到曲线的外观。

内切椭圆：与绘制圆形的原理相同，只是外切的不是正方形而是矩形。

圆弧：在画板上取三个点，三个点构成一个三角形，求其外接圆，再显示第一点和第三点之间外接圆逆时针方向上的圆弧。三角形三条边的中点垂线必交于一点，这一点称为“外心”，实际上就是外接圆的圆心。可以求出两条边中点垂线的斜率，进而求出两条边中点垂线的焦点，这个交点就是外接圆的圆心。

椭圆弧：绘制椭圆弧分两步，首先是绘制椭圆，然后取其中的椭圆弧。椭圆弧的取向是顺时针方向。

贝赛尔曲线：贝赛尔样条曲线是由两个终点和两个起“牵拉”作用的中间点确定的一条光滑曲线，最初是帮助工程师给汽车车身建立数学模型的，如今从字体到弹头的设计都使用这样的样条曲线。绘制贝赛尔样条曲线，使用两个参数，一个是 Point 数组指针，另一个 *nCount* 表示数组点的个数。*nCount* 必须是一个 3 的倍数加 1 的整数( $3n + 1$ )，如 4、7、11.....，因为绘制一条贝赛尔曲线需要 4 个点，如果绘制连续的两条，则前一条的终点将作为后一条的起点，这样需要 7 个点的数组。

文字输入：当选择文本输入工具时，显示文本框，同时显示文字输入工具栏。

如图 4 所示的控制面板包括画笔、画刷、背景的颜色设置和风格设置。

其中，进行画笔、画刷或背景颜色设置时，可以通过滑杆选择多达16,777,216种颜色，而且设置方法简单直观。通过滑杆条取色，在窗口显示配制的颜色，这种功能还没有在其它系统中使用。

在风格设置中，可以设置画笔的线宽，还可以将画笔设为实线或各种虚线，画刷的风格可以设为空心、实心或阴影画刷，而且有6种阴影图形可供选择。

本发明白板系统可以查看本机的IP地址和其它性能参数，如内存大小、硬盘空间大小等，这对于网络通信时发出正确的连接请求，以及系统的移植很有帮助。如果一个用户将本系统移植在一台陌生的机器上使用，那么他可以很快知道这台机器的IP地址和机器性能参数，如内存大小、硬盘空间大小。

本白板系统记录有绘图的顺序，可以回撤和恢复，在错误绘图时和实验绘图时，能够方便地修改，这也是其它白板没有出现的功能。



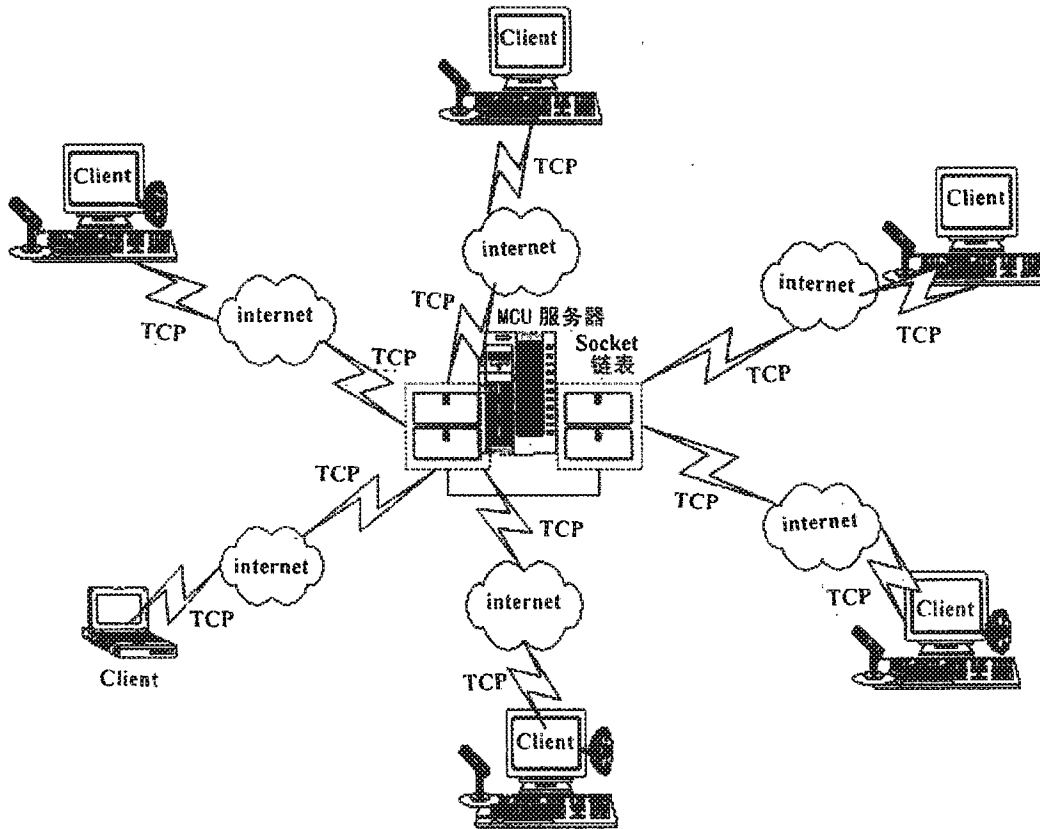


图 1



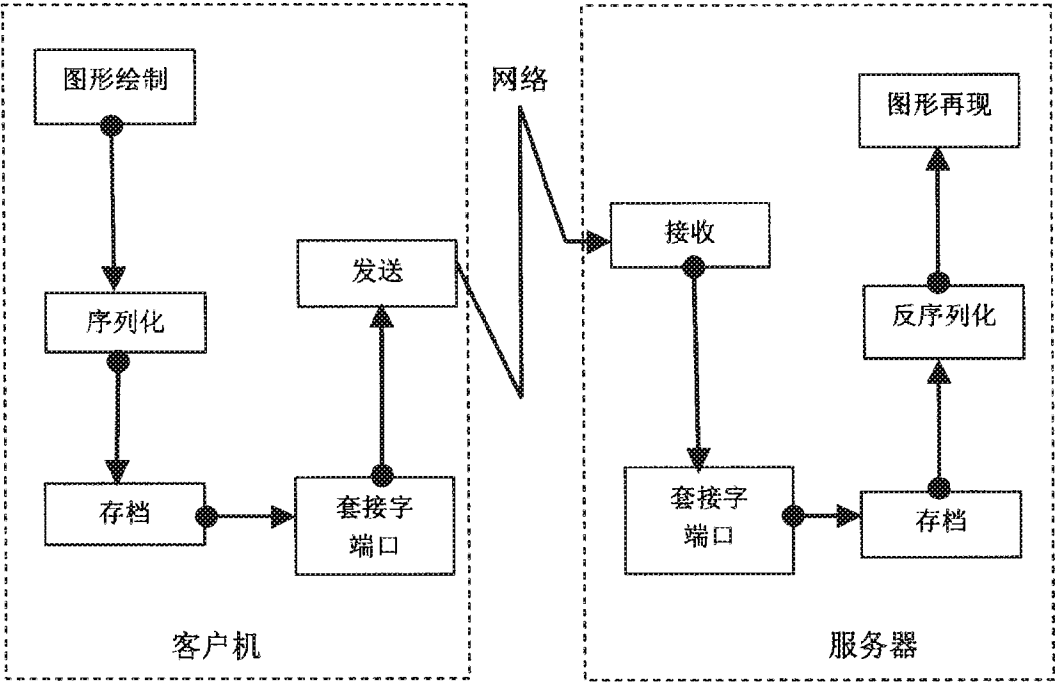


图 2



图 3

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说明书附图 第3/3页

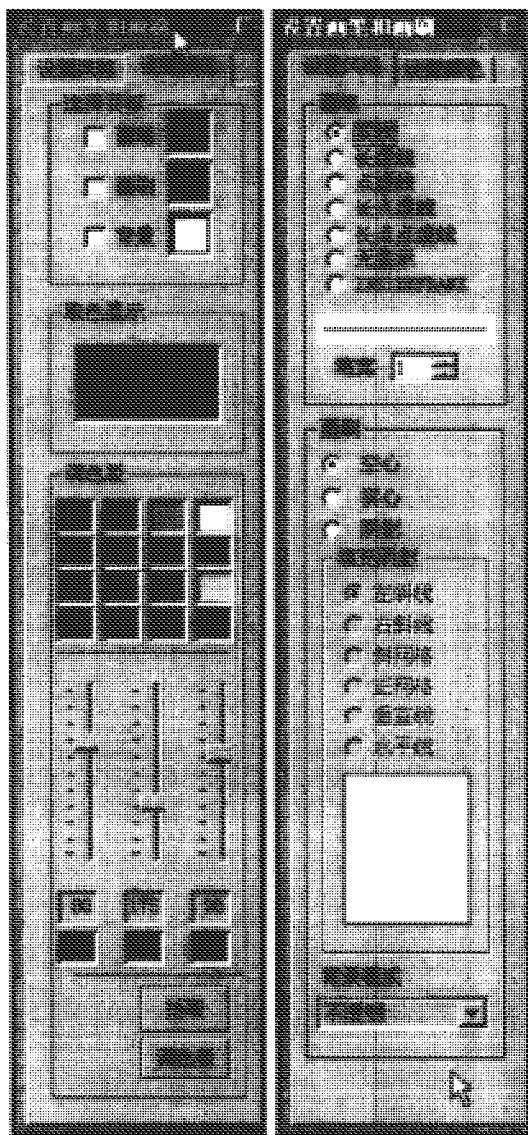
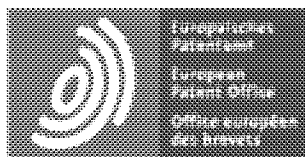


图 4



Espacenet

CN101046952A Audio network system

Applicants: YAMAHA CORP [JP]

Inventors: KEI NAKAYAMA [JP]

Classifications:

IPC

**G10H1/00; H04L12/42;**

CPC

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Audio network system

Abstract

An audio network system allows any two nodes among a plurality of nodes to transmit and receive audio data to and from each other. The plurality of the nodes are connected in loop so as to allow transmission of the audio data in loop manner through the plurality of the nodes; and the transmission of the audio data is performed in one direction from an upstream node to a downstream node. One of the plurality of the nodes is set as a master node and the other nodes are set as slave nodes. The master node periodically transmits a packet of frame data containing the audio data every sampling period, such that the packet transmitted from the master node circulates through the plurality of the nodes to return to the master node within one or more sampling period. The packet has a specific data length and includes an audio data storage region divided into a plurality of blocks corresponding to a plurality of channels, such that each of the blocks stores audio data of the corresponding channel.

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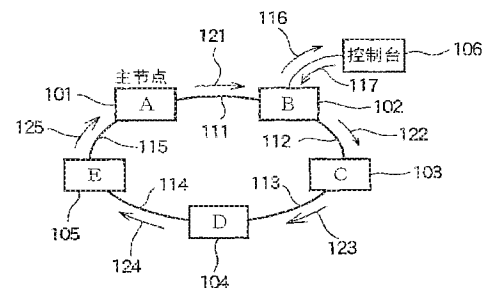
权利要求书 4 页 说明书 19 页 附图 9 页

[54] 发明名称

音频网络系统

[57] 摘要

一种音频网络系统，允许多个节点中的任两个节点之间相互发送和接收音频数据。所述多个节点连接成环以允许经由多个节点以环的形式发送音频数据，并且在环中从上游节点至下游节点的一个方向上执行音频数据的发送。所述多个节点中的一个节点设为主节点，而将其它节点设定为从节点。主节点在每个采样周期中周期性发送包含音频数据的一个帧数据包，使得主节点在每个采样周期中发送的包在一个或多个采样周期中经由多个节点循环而返回到主节点。所述包具有预定的数据长度，并包括对应于多个信道而划分成多个区块的音频数据存储区，使得每个区块存储对应信道的音频数据。



1. 一种音频网络系统，包括多个节点并允许所述多个节点中的任两个节点相互发送和接收音频数据，

其中，所述多个节点连接成环以允许经由所述多个节点以环的形式发送所述音频数据，并且在该环中从上游节点至下游节点的一个方向上执行所述音频数据的发送；

其中，将所述多个节点中的一个节点设定为主节点，将其它节点设定为从节点；

其中，所述主节点在每个采样周期中周期性发送包含所述音频数据的帧数据包，使得所述主节点在每个采样周期中发送的包在一个或多个采样周期中经由所述多个节点循环而返回到所述主节点；

其中，所述包具有预定的数据长度，并包括对应于多个信道而划分成多个区块的音频数据存储区，使得每个区块存储对应信道的音频数据；

其中，为所述多个节点中的每个节点设定发送信道或接收信道，所述发送信道和所述接收信道均表示所述包的多个区块之一；

其中，每一所述从节点在每个采样周期中从所述包的报头开始逐个区块地从上游节点接收所述包，如果所述包的已接收区块对应于为所述从节点设定的发送信道，所述从节点运行为：用所述从节点待发送的音频数据重写所述已接收区块；另一方面，如果所述包的已接收区块对应于为所述从节点设定的接收信道，所述从节点运行为：从所述已接收区块获取所述从节点待接收的音频数据，然后在从所述从节点开始接收所述包的报头时起已经过去预定时间之后，所述从节点开始将所述包发送至下游节点；

其中，所述主节点在每个采样周期中从所述包的报头开始逐个区块地接收已从最下游节点返回的包，并基于已接收的包构建待在下一个采样周期中发送的下一个包或所述下一个包之后的包的每个区块，如果所述包的区块对应于为所述主节点设定的发送信道，所述主节点运行为：用所述主节点待发送的音频数据重写所述区块；另一方面，如果所述包的区块对应于为所述主节点设定的接收信道，所述主节点运行为：从所述区块获取所述主节点待接收的音频数据，并且在所述下一个采样周期开始时，所述主节点开始将已构

建的包发送至下游节点；

其中所述已构建的包与所述主节点构建该包所基于的包包含相同的音频数据；以及

其中在所述音频网络系统中一个发送信道仅设定给一个节点，以使音频数据在所述音频网络系统中的循环期间由所述一个节点写入区块的音频数据不被另一节点重写，并且所述音频网络系统中的任一节点能够接收所述音频数据。

2. 根据权利要求 1 所述的音频网络系统，其中所述包除了包括所述音频数据存储区之外还包括控制数据存储区，所述包的控制数据存储区用于允许所述多个节点中的任两个节点相互发送和接收控制数据。

3. 根据权利要求 1 所述的音频网络系统，其中所述包具有符合以太网标准的数据大小和数据结构，并且由以太网标准定义的发送器、接收器以及传输电缆可用于所述包的传输。

4. 根据权利要求 1 所述的音频网络系统，其中所述多个节点连接成允许所述包以环发送的形式，使得所述多个节点通过一条线路级联连接以便沿一个方向发送所述包，并且所述多个节点还通过另一条线路级联连接以便沿另一方向发送所述包。

5. 根据权利要求 1 所述的音频网络系统，其中所述多个节点连接成允许所述包以环发送的形式，使得所述多个节点从第一节点至最末节点级联连接以便沿一个方向发送所述包，并且所述最末节点连接至所述第一节点以使所述包返回至所述第一节点。

6. 一种音频网络系统，包括多个节点并允许所述多个节点中的任两个节点相互发送和接收音频数据，

其中，所述多个节点连接成环以允许经由所述多个节点的环发送所述音频数据，并且在该环中从上游节点至下游节点的一个方向上执行所述音频数据的发送；

其中，将所述多个节点中的一个节点设定为主节点，将其它节点设定为从节点；

其中，所述主节点在一个采样周期中依次发送包含所述音频数据的预定数量的帧数据包，使得在每个采样周期中所依次发送的包在一个或多个采样



周期中经由所述多个节点循环而返回到所述主节点；

其中，所述预定数量的包中的每一个具有预定的数据长度，并包括对应于多个信道而划分成多个区块的音频数据存储区，使得每个区块存储一个信道的音频数据；

其中，为所述多个节点中的每个节点设定发送信道或接收信道，所述发送信道和所述接收信道均表示所述包的多个区块之一；

其中，每一所述从节点在每个采样周期中从所述包的报头开始逐个区块地从上游节点接收所述依次发送的包中的每一个，如果所述包的已接收区块对应于为所述从节点设定的发送信道，所述从节点运行行为：用所述从节点待发送的音频数据重写所述已接收区块；另一方面，如果所述包的已接收区块对应于为所述从节点设定的接收信道，所述从节点运行行为：从所述已接收区块获取所述从节点待接收的音频数据，并且在从所述从节点开始接收所述包的报头时起已经过去预定时间之后，所述从节点将所述包发送至下游节点；

其中，所述主节点在每个采样周期中从每个包的报头开始逐个区块地接收已从最下游节点依次返回的预定数量的包中的每一个，并基于已接收的包创建待在下一个采样周期中发送的预定数量的后续包的每个区块，如果所述包的所述区块对应于为所述主节点设定的发送信道，所述主节点运行行为：用所述主节点待发送的音频数据重写所述区块；另一方面，如果所述包的所述区块对应于所述主节点的接收信道，所述主节点运行行为：从所述区块获取所述主节点待接收的音频数据，然后在所述下一个采样周期开始时，所述主节点开始将所创建的预定数量的后续包发送至下游节点，

其中所创建的包与所述主节点创建该包所基于的包包含相同的音频数据；以及

其中在所述音频网络系统中一个发送信道仅设定给一个节点，以使音频数据在所述音频网络系统中的循环期间由所述一个节点写入区块的音频数据不被另一节点重写，并且所述音频网络系统中的任一节点能够接收所述音频数据。

7. 根据权利要求 6 所述的音频网络系统，其中所述预定数量的包中的至少一个包除了包括所述音频数据存储区之外还包括控制数据存储区，所述包的控制数据存储区用于允许所述多个节点中的任两个节点相互发送和接

收控制数据。

8. 根据权利要求 6 所述的音频网络系统，其中所述包具有符合以太网标准的数据大小和数据结构，并且由以太网标准定义的发送器、接收器以及传输电缆可用于所述包的传输。

9. 根据权利要求 6 所述的音频网络系统，其中所述多个节点连接成允许所述包以环发送的形式，使得所述多个节点通过一条线路级联连接以便沿一个方向发送所述包，并且所述多个节点还通过另一条线路级联连接以便沿另一方向发送所述包。

10. 根据权利要求 6 所述的音频网络系统，其中所述多个节点连接成允许所述包以环发送的形式，使得所述多个节点从第一节点至最末节点级联连接以便沿一个方向发送所述包，并且所述最末节点连接至所述第一节点以使所述包返回至所述第一节点。



## 音频网络系统

### 技术领域

本发明涉及一种连接多种音频装置的音频网络系统。

### 背景技术

用于 PA（例如演奏和音乐会）、音乐制作和专用广播中的音频网络系统中的音频信号通信的现有技术包括：非专利文献 1 中描述的 CobraNET（商标），非专利文献 2 中描述的 SuperMAC（商标），和非专利文献 3 中描述的 EtherSound（商标）。

CobraNet 是由 Peak Audio 公司（美国）开发的专业音频网络系统。CobraNET 提供一种利用 IEEE802.3u 的标准以太网（standard Ethernet）（商标）协议的技术，其中通过以太网传输多信道的未压缩音频信号和控制信号。这种技术可以传输的采样率为 48 kHz 且位数为 16、20 和 24 位的采样数据，并且可以双向处理音频信号和控制信号，其中在每个方向具有一直到 64 信道（即，在双向具有一直到 128 信道）。SuperMAC 和 EtherSound 为用于通过以太网传输音频数据的相似技术。

具有各种功能（例如模拟输入、模拟输出、数字输入、数字输出、混合、效果、记录/再现、远程控制和这些功能中的任何两种的组合）的音频装置可以选择性地连接至使用上述技术的音频网络。[非专利文献 1]

<http://www.balcom.co.jp/cobranet.htm>

[非专利文献 2]

<http://www.sonyoxford.co.uk/pub/supermac/>

[非专利文献 2]

[http://www.ethersound.com/news/getnews.php?enews\\_key=101](http://www.ethersound.com/news/getnews.php?enews_key=101)

在任一种传统音频网络中，根据上述 Ethernet 标准执行音频传输。在 Ethernet 标准中，最大的包大小限于 1526 字节。

在传统技术中，不只音频数据包，如指令、对指令的回应以及节拍(meter)

显示的等级数据之类的控制数据包也能够网络上流动。然而，当多个相同或不同种类的包被获准在网络上流动时，用于传输音频数据的带宽相应减少。由于除了音频数据之外其它包也在网络上流动，因此这些包可能干扰音频数据的传输。这种情况在采用 CSMA/CD 方法的 Ethernet 中尤为严重。

此外，由于对应于多个采样周期的采样是通过合并成一个包而传输的，因此将多个采样打包成为一个包和将一个包重构成为多个采样是很花时间的，并且用于打包和重构的电路复杂。

## 发明内容

本发明的目的是提供能够稳定地传输音频数据并能够简化每个节点处数据传输和接收电路的音频网络系统。

根据本发明，上述目的可通过提供一种音频网络系统来实现，所述音频网络系统包括多个节点并允许所述多个节点中的任两个节点相互发送和接收音频数据。所述多个节点连接成环以允许经由所述多个节点以环的形式发送所述音频数据，并且在该环中从上游节点至下游节点的一个方向上执行所述音频数据的发送。将所述多个节点中的一个节点设定为主节点，将其它节点设定为从节点。所述主节点在每个采样周期中周期性发送包含所述音频数据的帧数据包，使得所述主节点在每个采样周期中发送的包在一个或多个采样周期中经由所述多个节点循环而返回到所述主节点。所述包具有预定的数据长度，并包括对应于多个信道而划分成多个区块的音频数据存储区，使得每个区块存储对应信道的音频数据。为所述多个节点中的每个节点设定发送信道或接收信道，所述发送信道和所述接收信道均表示所述包的多个区块之一。每一所述从节点在每个采样周期中从所述包的报头开始逐个区块地从上游节点接收所述包，如果所述包的已接收区块对应于为所述从节点设定的发送信道，所述从节点运行行为用所述从节点待发送的音频数据重写所述已接收区块；另一方面，如果所述包的已接收区块对应于为所述从节点设定的接收信道，所述从节点运行行为从所述已接收区块获取所述从节点待接收的音频数据，然后在从所述从节点开始接收所述包的报头时起已经过去预定时间之后，所述从节点开始将所述包发送至下游节点。所述主节点在每个采样周期中从所述包的报头开始逐个区块地接收已从最下游节点返回的包，并基于已

接收的包构建待在下一个采样周期中发送的下一个包或所述下一个包之后的包的每个区块，如果所述包的区块对应于为所述主节点设定的发送信道，所述主节点运行为：用所述主节点待发送的音频数据重写所述区块；另一方面，如果所述包的区块对应于为所述主节点设定的接收信道，所述主节点运行为：从所述区块获取所述主节点待接收的音频数据，并且在所述下一个采样周期开始时，所述主节点开始将已构建的包发送至下游节点。所述已构建的包与所述主节点构建该包所基于的包包含相同的音频数据。在所述音频网络系统中一个发送信道仅设定给一个节点，以使所述音频数据在所述音频网络系统中的循环期间由所述一个节点写入区块的音频数据不被另一节点重写，并且所述音频网络系统中的任一节点能够接收所述音频数据。

尽管在一个至几个采样周期中以环形式发送一个包，但是在不脱离本发明范围的情况下，也可以在一个至几个采样周期中以环形式发送预定数量的包。

一个或预定数量的包（优选地，预定数量的包中的至少一个）除了包括所述音频数据存储区之外还包括控制数据存储区，其中所述包的控制数据存储区用于允许所述多个节点中的任两个节点相互发送和接收控制数据。

尽管包的大小和结构是可变的，但是优选地，所述包具有符合 Ethernet 标准的数据大小和数据结构，并且由 Ethernet 标准定义的发送器、接收器以及传输电缆可用于所述包的传输。

在一种形式下，所述多个节点连接成允许所述包以环发送的形式，使得所述多个节点通过一条线路级联连接以便沿一个方向发送所述包，并且所述多个节点还通过另一条线路级联连接以便沿另一方向发送所述包。

在另一种形式下，所述多个节点连接成允许所述包以环发送的形式，使得所述多个节点从第一节点至最末节点级联连接以便沿一个方向发送所述包，并且所述最末节点连接至所述第一节点以使所述包返回至所述第一节点。

根据本发明，在每个采样周期中的任何时刻，预定数量的包（例如，一个包）在网络上循环。这实现了非常稳定的通信。例如，在每个采样周期循环一个包的情况下，能够接收和发送包的每个节点在每个采样周期中可发送音频数据的一个采样，从而以逐个采样的方式进行输出，或者在每个采样周

期中可接收音频数据的一个采样，从而以逐个采样的方式进行接收。这使得可以容易地再现采样时钟和简化打包（packetization）电路。此外，由主节点发送的包在保持其数据结构的同时被以环的形式运送，并且每个从节点只需要用音频数据重写分配给该从节点的一个信道的区域，或者从为该从节点设定的另一信道的区域提取音频数据。这显著简化了每个从节点中用于输出或输入一个包的音频数据的电路。使用 Ethernet 标准的包使得能够使用与 Ethernet 兼容的发送器、接收器以及传输电缆，从而能够使用易于获得的廉价硬件。

## 附图说明

图 1a 和图 1b 示出在应用根据本发明的音频网络系统时节点之间的连接实例和节点之间的传输实例。

图 2a 至图 2f 示出本实施例的音频网络系统中包中的位数据流。

图 3 示出一个包的帧数据结构。

图 4 示出每个节点中包含的帧数据发送/接收单元的结构。

图 5 示出每条传输线上的包的时序图。

图 6 为示出本实施例中音频采样的传输流的示意图。

图 7a 和图 7b 为示出从节点中的硬件处理的流程图。

图 8a 至图 8c 为示出主节点中的硬件处理的流程和缓冲器结构图。

图 9a 和图 9b 为主节点中的采样时钟中断处理和 1 字节发送事件处理的流程图。

## 具体实施方式

下面将参照附图描述本发明的实施例。

图 1a 和图 1b 示出在应用根据本发明的音频网络系统时节点之间的连接实例和节点之间的传输实例。图 1a 示出主节点 A101 和从节点 B102、C103、D104 和 E105 的环形连接实例。标号“111”至“115”表示节点之间连接的物理连接线。在这种网络系统中，连接的节点中只有一个节点是主节点。这里，节点 A101 是主节点，而其它节点是从节点。箭头“121”至“125”均表示包的每位数据的传输方向。

主节点 A101 定期发送多个包，每一个采样周期发送一个包，所述采样周期为网络系统中的音频信号采样时钟的周期。具体来说，在一个采样周期中，每个节点 101 至 105 从上游节点接收一个包的位数据，并将这一个包的位数据输出至下游节点。主节点 A101 执行采样周期的同步。具体来说，在一个采样周期的开始时刻，主节点 A101 开始将一个包的位数据发送至下游节点 B102。在完成一个包的位数据的发送之后，主节点 A101 等候直到该采样周期终止。在下一个采样周期的开始时刻，主节点 A101 开始将下一个包的位数据发送至下游节点 B102。

本实施例的网络系统中的包与传统 Ethernet 标准中使用的包相同。然而，在传统 Ethernet 中，以包为基础执行传输，并且直到节点之间的传输终止时节点之间传输的数据包才会被重写。另一方面，在本实施例中，在从主节点发送的包经过回路中的各从节点直到返回主节点的同时，数据包被重写，下面将对此进行更详细地描述。在本实施例中，每个采样周期传输音频数据的容器称为“包”。不限于 Ethernet 标准的包，本发明可使用任何其它格式的包。

尽管在 OSI 基准模式下在层 3 中处理的数据单元称为“包”，而在层 2 中处理的数据单元称为“帧”，但在本实施例中如上所述，每个采样周期传输的音频数据的容器称为“包”，而实现包的位数据序列称为“帧”。因此，在本实施例中术语“包”和“帧”指代相同内容。

一个包包括这样的区域，所述区域包含音频数据和多个信道的控制数据（如指令、对指令的回应以及节拍显示的等级数据之类）。对于每个节点，在节点中设定用于从该节点发送的多个信道之一（发送信道），和/或在节点中设定用于该节点接收的另一信道（接收信道）。因此，当在一个采样周期中一个包的位数据经过每个节点而使得该节点从上游节点接收位数据并将其输出至下游节点时，该节点用从该节点待发送的音频数据的采样重写包中位于该节点的发送信道区域中的位数据，并加载包中位于节点的接收信道区域中的位数据，这是因为位于接收信道区域中的位数据是该节点待接收的音频数据。在一个包的位数据经过每个节点的时，该节点执行至发送信道的上述数据写操作和从接收信道的上述数据加载操作。之后，该节点将这—个包的位数据发送至紧接着的下游节点。在主节点 A101 中执行相同的处理。具



体来说,主节点 A101 接收从最下游节点 E105 发送的包,并用从主节点 A101 待发送的音频数据的采样重写包中分配给主节点 A101 的发送信道,并将主节点 A101 通过分配给主节点 A101 的接收信道待接收的音频数据加载至包中。通过上述处理产生的数据包是下一个采样周期将发送的数据包。

作为将参照图 3 描述的每个包(帧)的具体结构,在每个包中不仅设定上述用于设定每个信道音频数据的区域,而且设定用于存储控制数据的区域。利用用于存储控制数据的区域,能够在节点之间发送和接收(即通信)各种控制数据。

控制台 106 连接至节点 B102。例如,当前往控制台 106 的数据包含在节点 B102 接收的控制数据中时,如箭头 116 所示,将控制数据从节点 B102 发送至控制台 106。当控制台 106 具有待发送至节点的控制数据时,如箭头 117 所示,控制台 106 将控制数据发送至节点 B102,并且节点 B102 在对应区域中设定在网络上循环的控制数据包,并将其发送至目标节点。将参照图 3 描述发送和接收控制数据的具体方法。

图 1b 示出通过双连接线将节点级联连接的实例。在本实例中,在使用前向线和后向线的回路中传送包,其中包通过前向线在向前的方向上流动,包通过后向线在向后的方向上流动。标号“141”表示主节点 A,而标号“142”至“144”表示从节点 B、C 和 D。主节点 A141 和从节点 B142 通过前向信号线 151 和后向信号线 156 连接。类似地,节点 B142 和节点 C143 通过连接线 152 和 155 连接,节点 C143 和节点 D144 通过连接线 153 和 154 连接。包流动的方向由箭头 161 至 166 表示。图 1b 所示的实例与图 1a 所示的实例基本相同之处在于:从主节点 A141 输出的一个包的位数据经由各节点循环并返回至节点 A141,如箭头 161 至 166 所示。然而,在图 1b 所示的实例中,在到达末端从节点 D144 之后在返回主节点 A 的过程中,包经过节点 C 和 B。在前向路径上执行每个节点 A 至 D 的音频数据和控制数据的写和读。在沿着节点 A 至 D 的返回路径上,不执行数据加载或写,使得数据只经过各节点。在图 1b 所示的实例中,末端节点 A 是主节点。然而,同样在将中间节点 B 或 C 设定为主节点时,箭头 161、162 和 163 的路径称为“前向路径”,而箭头 164、165 和 166 的路径称为“后向路径”,并且在前向路径上执行数据加载或写(在图 1b 中在前向路径上包在向右的方向上行进)。在这种

情况下，主节点（其位于图的中部）左侧的从节点首先在前向路径上接收包，然后在后向路径上接收包，但是在前向路径上执行数据加载或写。此外，在后向路径上可以执行数据加载或写，而不是在后向路径上仅使数据经过每个节点。

在环形连接的情况下，在多个节点依次连接之后，多个节点中的末端节点必须相互连接。另一方面，在级联连接的情况下，只需要使用双连接线依次连接多个节点。因此，级联连接的装置可具有更简单的结构。

图 2a 至图 2f 示出本实施例的音频网络系统中包中的位数据流。在以下对本实例的描述中，假定主节点 A 和从节点 B 和 C 通过前向路径和后向路径连接，如图 1b 所示。

在一个采样周期的开始时刻，主节点 A 开始传输一个包的位数据。图 2a 示出主节点 A 将包的头位 B0 发送至下游节点 B 的状态，如箭头 201 所示。之后，以与从主节点 A 输出的网络时钟同步的方式，主节点 A 依次逐位发送包中的头位 B0 后面的各位数据。图 2b 示出在对应于 50 位的时间已经过去时刻主节点 A 将包的第 51 位 B1 发送至节点 B 的状态，如箭头 203 所示。此时，节点 B 将接收到的头位 B0 发送至下一节点 C，如箭头 202 所示。当然，中间的各位也被传输，尽管图中只关注第五十位。类似地，主节点 A 相继输出由第 101 位 B2、第 151 位 B3 和第 201 位 B4 表示的位数据，如图 2c 至图 2e 所示，并且输出的位数据在经过各节点之后返回主节点 A。图 2e 示出已返回主节点 A 的包的头位 B0 被存储在缓冲器中的状态，如标号“211”所示。图 2f 示出已相继返回主节点 A 的 500 位数据 B0-B10 被存储在缓冲器中的状态，如标号“216”所示。主节点 A 在以上述方式发送包的所有位之后等候直到该采样周期终止，然后开始发送下一采样周期的包，如图 2a 所示。然而，在图 2f 的时刻主节点 A 还没有接收到该采样周期的包的最末位。

当如上所述一个包的位数据在一个采样周期中循环一次时，每个节点加载在该节点处待加载的接收信道的位数据，并写入在该节点处待写入的传输信道的位数据。例如，如果节点 B 接收到的位数据是已设定为在节点 B 处待加载的接收信道的采样数据，则节点 B 将该位数据加载至节点 B 的缓冲器中。此外，如果接收到的位数据是已设定为从节点 B 待发送的发送信道的采样数据，则用待写入的数据重写该位数据。在执行这一处理之后，将该位数据发

送至下一节点 C。在下一节点处执行相同处理。控制数据的加载和写以相同方式执行。如上所述，在前向路径（图 2 中沿着节点 A→B→C）上执行本实施例中每个节点处的数据加载或写，而在后向路径（沿着节点 C→B→A）上数据仅经过各节点。

图 3 示出在本实施例的音频网络系统中在一个采样周期中循环经由所有连接节点的一个包的帧数据结构。例如，一个包的帧数据的字节总数为 1282。

标号“301”表示存储前同步码（preamble）、目标 MAC 地址、源 MAC 地址以及数据长度的区域。前同步码是用于在传输帧数据时在每个节点处建立同步的数据。每个节点从自上游节点接收的数据中检测前同步码，并根据检测到的前同步码确定包的帧数据已经开始。在目标 MAC 地址中设定表示广播的十六进制值“FF…FF”（其可以是根据包的流动接收该包的下一节点的 MAC 地址），并且在源 MAC 地址中设定主节点的 MAC 地址（其可以是发送包的节点的 MAC 地址）。本音频网络系统中的每个节点（包括图 1a 或图 1b 中的控制台 106 和 145）均具有 MAC 地址。“长度”表示本帧数据的总长度（例如 1282 字节）。

标号“302”表示存储包序号 TN、每个采样周期中的包数 PN、采样延迟值 SD、和音频信道数 ACN 的 8 字节区域。包序号 TN 是分配给包的序号，其在每次主节点开始发送包时增加。当在一个采样周期中循环多个包时（在修改例中将对此进行描述），包的每个采样周期中的包数 PN 为表示采样周期中包序数的包序号。在本实施例中没有使用每个采样周期中的包数 PN，这是因为在一个采样周期中循环一个包。音频信道数 ACN 表示下文描述的音频数据存储区 303 的信道数量。

标号“303”表示存储音频数据的区域。这里，采样频率  $F_s$  为 96kHz，并且一个采样被分为可存储 256 信道的 32 位数据的区块。因此，ACN 被设定为 256。256 信道的各个区块是设定从头起依次为第 1 信道、第 2 信道、…第 256 信道的采样数据的区域。这里，为了确保稳定的音频传输，甚至于对未用于节点间传输的信道，也总是确保其带宽。例如，即使在网络系统中的任一节点处对某一信道的区块不执行写时，主节点也不去除该信道的区块。因此，音频信道数 ACN 具有恒定值，其等于可传输信道的最大数。主节点可将无声音频信号写至未被使用信道的区块。



标号“304”表示存储控制数据的 224 字节区域。控制数据包括多种数据，例如指令、回应和等级数据。例如，当某一节点成为需要将一些数据发送至接收节点的发送节点时，执行以下过程。首先，由于在控制数据存储区 304 的预定位置设定表示发送数据权的标志，因此需要发送控制数据的节点获得在每个采样周期经由各节点循环的包中所包含的令牌（token）。当某一节点获得该令牌时，则该节点取得发送权，并且其它节点在该节点释放该令牌之前不能获得该令牌。已获得令牌而具有发送权的节点创建传统 Ethernet 标准（其中在目标 MAC 地址中设定接收节点的 MAC 地址）的发送数据包（所述发送数据包包括该节点需要发送的数据），然后该节点划分发送数据包并将其插入控制数据存储区 304，以将其以具有图 3 所示格式的多个已划分包的形式分别进行发送。已接收该包的每个节点加载控制数据存储区 304 的数据。如果加载的数据是 Ethernet 标准的发送数据包的已划分数据，则该节点组合分别接收到的多个已划分数据，以重构 Ethernet 标准的发送数据包并确定其目标 MAC 地址是否为该节点的地址。如果目标 MAC 地址是该节点的地址，则该节点加载发送数据包。当目标 MAC 地址不是该节点的地址时，该节点放弃该发送数据包。通过上述方式在图 3 所示的循环包中携带控制数据，能够在各节点之间发送和接收控制数据。

令牌可以不总循环。例如，每次包循环预定次数时，令牌可以经由以环形连接的各节点循环一次。当音频网络系统启动时，在其初始化过程中为所有节点提供连接至网络的节点（包括图 1a 或图 1b 的控制台 106 或 145）的相应 MAC 地址或连接位置。因此，能够以与一般 LAN 相同的方式在节点之间传递控制数据。或者，执行系统整体控制的控制台可管理令牌。例如，在包的 control 数据区设定用于存储标记（flag）（其用于请求对应于每个节点的令牌）的区域，并且通过设定标记从控制台请求令牌，响应于该请求控制台为进行该请求的节点分配令牌。在这种情况下，在完成包发送时，该节点将令牌返回控制台。

标号“305”表示用于错误检验的 FCS 区域。在本实施例中，FCS 区域 305 仅对一对发送和接收节点有效，这是因为图 3 所示的包在经由每个节点循环的同时被重写，如以上参照图 1a 或图 1b 所述。例如，节点 A 在其 FCS 区域 305 中设定帧数据的 FCS 之后将帧数据发送至节点 B，并且节点 B 通过

校验接收到的帧数据的 FCS 来确定帧数据是否被正常接收。当帧数据被正常接收时，从帧数据读出的音频采样被再现，或者基于从帧数据读出的控制数据执行控制，并且基于已进行音频采样写入的帧数据或者在对应节点处待重写的控制数据也产生 FCS，然后在 FCS 区域 305 中设定产生的 FCS 之后将帧数据发送至节点 B。当帧数据被异常接收时，从帧数据读出的音频采样或控制数据被放弃，而再现的音频采样被消减，并在对应节点的 FCS 区域 305 中或者在紧接着的前一区域中设定表示对应节点的接收出现错误的信息之后，将帧数据发送至节点 B。

图 4 示出每个节点中包含的帧数据发送/接收单元的结构。帧数据发送/接收单元包括帧接收器 401、帧重构器 402、帧发送器 403、音频采样提取器 404、信道寄存器 (CH) 405、音频输出缓冲器 406、音频输入缓冲器 407、信道寄存器 408、帧接收器 409 以及帧发送器 410。

从帧接收器 401 经由帧重构器 402 至帧发送器 403 的路径为本节点的前向路径，而从帧接收器 409 至帧发送器 410 的路径为本节点的后向路径。如果节点（例如，图 1b 的节点 A）未连接至既用作帧发送器 410 的输出目标节点又用作帧接收器 401 的输入源节点的任一节点，则帧发送器 410 自动连接至帧接收器 401，使得数据从帧发送器 410 直接被传递至帧接收器 401。如果节点（例如，图 1b 的节点 D）未连接至既用作帧发送器 403 的输出目标节点又用作帧接收器 409 的输入源节点的任一节点，则帧发送器 403 自动连接至帧接收器 409，使得数据从帧发送器 403 直接被传递至帧接收器 409。

在图 4 中，从上游节点发送的位数据依次被帧接收器 401 接收。帧接收器 401 从接收到的位数据提取网络时钟，还检测以上参照图 3 描述的前同步码部分，并基于前同步码部分的末端检测音频数据 303 范围内的数据。音频采样提取器 404 提取音频数据 303 的每个信道的时隙的采样数据。如果在信道寄存器 405 中已设定该信道，则采样数据被复制到音频输出缓冲器 406。信道寄存器 405 是存储在对应节点处待加载的一个接收信道（或多个接收信道）的寄存器。

另一方面，帧接收器 401 依次接收的位数据被发送至帧重构器 402。帧重构器 402 包括预定位数的缓冲器（例如，几十位至几百位的移位寄存器）。在接收到的位数据流过缓冲器时，帧重构器 402 基于前同步码的末端检测每

个信道的时隙（时钟）的数据。如果在信道寄存器 408 中已经设定该时隙的信道，则帧重构器 402 用存储在音频输入缓冲器 407 中的待写入信道的采样数据重写该时隙。尽管该缓冲器 407 设置为用于执行数据重写，但是该缓冲器也用于补偿节点接收到的位数据的网络时钟与节点发送的位数据的网络时钟之间的差异。然而，由于缓冲器的大小对应于节点处的传递延迟，因此该缓冲器不能设计为过大。信道寄存器 408 是存储本节点处待重写的发送信道（或多个发送信道）的寄存器。由帧重构器 402 重构的帧数据经由帧发送器 403 被发送至下游节点。

在后向路径上，从上游节点的帧发送器发送且被帧接收器 409 接收的数据未经改变而被传递至帧发送器 410，然后被发送至下游节点。

基于由上游节点的帧发送器产生的网络时钟执行从上游节点的帧发送器至帧接收器 401 的数据传输，并且基于由帧发送器 403 产生的网络时钟执行从帧发送器 403 至下游节点的数据传输。因此，帧接收器 401 的接收操作和帧发送器 403 的发送操作异步执行。在后向路径上亦如此。

以上述方式，为本节点设定的信道的采样可被加载到本节点的音频输出缓冲器 406 中。此外，本节点处输入的音频数据的采样可在音频输入缓冲器 407 中设定，并且可通过在帧数据中设定信道的时隙中携带该采样而将其发送至另一节点。

下面将描述系统中使用的采样时钟  $C_s$ （字时钟）。系统的各节点为多种音频装置，每个音频装置以与其产生的采样时钟  $C_s$  同步的方式处理音频数据。如果在将音频数据从发送音频装置发送至接收音频装置时发送音频装置的采样时钟  $C_s$  的频率不同于接收音频装置的采样时钟  $C_s$  的频率，接收音频装置必须转换其采样频率，这是因为接收音频装置不能处理未转换的音频数据。然而，采样频率转换可能降低音频数据的质量。因此，在本系统中，由音频装置产生的采样时钟  $C_s$  与以采样周期的间隔从主节点接收包的时序（即，主节点产生采样时钟的时序）在相位上同步，由此近似匹配音频装置的采样时钟。这使得能够在不转换采样频率的情况下在音频装置之间发送和接收音频数据。更具体来说，主节点在其采样时钟  $C_s$  的产生时刻开始发送包。在接收包时，每个从节点通过帧接收器 401 检测包的前同步码部分，并基于前同步码部分的终止时刻通过锁相环（PLL）振荡器产生其采样时钟  $C_s$ 。

由于图 3 所示的包在每个采样周期经由系统的所有节点循环,因此每个节点能够产生同步的采样时钟。尽管每个节点处执行的处理引起延迟并且各节点之间的电缆也引起延迟,但是这些延迟实际上可忽略。在考虑这些延迟的情况下,可校正每个节点的时序以产生更准确的同步时钟。

图 5 示出每条传输线上包的时序图。例如,这可以视为图 1b 所示的传输线 111 上的包时序图,在所述传输线 111 上将包从主节点 A101 传送至下游节点 B101。这里,假定采样频率  $F_s$  为 96kHz。一个采样周期的时间长度为 10.4 微秒。标号“501”、“502”和“503”表示采样周期的开始时间。各节点之间的传输线的协议使用如上所述 Ethernet 标准的传输介质或物理层。这里,假定以 1000BASE-T Ethernet 标准的 1Gbps 速度在各节点之间进行数据传输。以上述速度,传输 1 位花费 1 纳秒,从而以上参照图 3 所述的一个包的帧数据的时间长度为 10.26 微秒(=1 纳秒 $\times$ 8 位 $\times$ 1282 字节)。这确保了一个包将包含在一个采样周期的时段中。因此,如图 5 所示,包“i”的位数据传输在采样周期的开始时刻 501 开始,而包“i”的传输在到达下一个采样周期的开始时刻 502 之前终止。对于包“i+1”和“i+2”亦如此。

图 6 为示出本实施例中音频采样的传输流的示意图。尽管图 6 中示出一个包被依次从图 6 中的每个节点传送到相邻节点,但是应注意实际的包遍布在多个节点上,如图 2 所示。这里假定节点 A601 是主节点,而 B602 和 C603 是从节点,并且各节点通过以上参照图 1b 所述的前向和后向路径连接。首先,假定采样 Ch1(s-2)、Ch2(s-2)和 Ch3(s-2)存储在帧 614 中,帧 614 是已准备为在预定时间(t)将由主节点发送的包。时间(t)的时间分辨率对应于采样周期,并且在 Ch\*的当前时间(t)的采样数据表示为 Ch\*(s)。因此,“Ch\*(s-3)”表示从 Ch\*的当前时间起 3 个采样之前的数据。已经返回到节点 A 的信道 Ch1、Ch2 和 Ch3 的 2 个采样之前的数据(s-2)被表示为包含在帧“611”中。

假定在时间(t)信道 Ch1、Ch2 和 Ch3 的采样数据 Ch1(s)、Ch2(s)和 Ch3(s)被输入到节点 601、602 和 603。标号“612”、“622”和“632”表示存储将被输入到节点 A、B 和 C 的相应信道的采样数据的缓冲器。标号“613”、“623”和“633”表示分别设置在节点 A、B 和 C 中的缓冲器(对应于图 4 所示的音频输入缓冲器 407)。这些缓冲器 613、623 和 633 均具有



能够存储 2 个采样的容量, 并且当前输入的采样数据  $Ch1(s)$ 、 $Ch2(s)$  和  $Ch3(s)$  被写至缓冲器 613、623 和 633。

主节点 A 基于帧 611 创建当前时间( $t$ )的帧 614, 其中在对应于时间( $t-1$ )的紧接着的前一个采样周期中帧 611 循环并返回到主节点 A, 在时间 ( $t-1$ ) 采样数据  $Ch1(s-1)$ 、 $Ch2(s-1)$  和  $Ch3(s-1)$  被存储在帧 611 中。主节点重写信道  $Ch1$  的采样数据  $Ch1(s-2)$ , 其中在存储于所创建的帧 614 中的采样数据  $Ch1(s-2)$ 、 $Ch2(s-2)$  和  $Ch3(s-2)$  中采样数据  $Ch1(s-2)$  被设定为在节点 A 处被写, 并且下一个采样  $Ch1(s-1)$  被存储在缓冲器 613 (618) 中。已经返回到节点 A 的帧 611 中存储的其它信道的采样按目前的样子设定。在当前时间 ( $t$ ) 的采样周期的开始时刻, 节点 A 将以这种方式创建的包的帧数据发送到节点 B。这里, 假定已经设定在节点 A 处信道  $Ch1$ 、 $Ch2$  和  $Ch3$  的各个采样数据将从循环的包加载。因此, 在节点 A 处, 返回的帧 614 的采样数据  $Ch1(s-2)$ 、 $Ch2(s-2)$  和  $Ch3(s-2)$  被加载到各个信道的缓冲器 615、616 和 617 中。这些缓冲器 615、616 和 617 对应于图 4 所示的音频输出缓冲器 406。信道的各个缓冲器 615、616 和 617 均构成为具有两个区域, 一个区域存储从在时间 ( $t$ ) 接收到的包加载的当前采样数据, 而另一个区域存储一个周期之前的采样数据。在图 6 中, 由节点写至包的信道的采样数据被表示为由同一节点加载。然而, 这样表示仅为了示出多个信道的采样数据被加载的实例。实际上, 由于由同一节点加载浪费资源, 因此不由同一节点加载采样数据。

节点 B 重写信道  $Ch2$  的采样数据  $Ch2(s-2)$ , 其中在存储于帧 624 中的采样数据  $Ch1(s-1)$ 、 $Ch2(s-2)$  和  $Ch3(s-2)$  中采样数据  $Ch2(s-2)$  被设定为在节点 B 处被写, 并且下一个采样  $Ch2(s-1)$  被存储在缓冲器 623 (628) 中。其它信道的采样按目前的样子设定。节点 B 将以这种方式创建的包的帧数据发送到节点 C。这里, 假定已经设定在节点 B 处信道  $Ch1$ 、 $Ch2$  和  $Ch3$  的各个采样数据将从循环的包加载。因此, 在节点 B 处, 帧 624 的采样数据  $Ch1(s-1)$ 、 $Ch2(s-2)$  和  $Ch3(s-2)$  被加载到各个信道的缓冲器 625、626 和 627 中。缓冲器 625、626 和 627 具有与节点 A 的缓冲器相同的结构。

节点 C 重写信道  $Ch3$  的采样数据  $Ch3(s-2)$ , 其中在存储于帧 634 中的采样数据  $Ch1(s-1)$ 、 $Ch2(s-1)$  和  $Ch3(s-2)$  中采样数据  $Ch3(s-2)$  被设定为在节点 C 处被写, 并且下一个采样  $Ch3(s-1)$  被存储在缓冲器 633 (638) 中。其它信

道的采样按目前的样子设定。节点 C 将以这种方式创建的包的帧数据返回到后向路径。这里，假定已经设定在节点 C 处信道 Ch1、Ch2 和 Ch3 的各个采样数据将从循环的包加载。因此，在节点 C 处，帧 634 的采样数据 Ch1(s-1)、Ch2(s-1)和 Ch3(s-2)被加载到各个信道的缓冲器 635、636 和 637 中。缓冲器 635、636 和 637 具有与节点 A 的缓冲器相同的结构。已经返回到后向路径的包仅经过由“631”、“621”和“631”表示的节点，从而返回到主节点 A。以相同的方式，主节点创建将在下一个采样周期发送的包，并在下一个采样周期的开始时刻将该包发送。

在本实施例中，只有主节点 A 能够在无任何采样滞后的情况下从每个节点获得音频采样数据，如从每个节点的采样加载缓冲器的状态看出的。另一方面，由于节点 B 或 C 具有将被上游节点处的下一采样重写的信道，因此在节点 B 或 C 处在从包加载采样数据时产生采样滞后。为了校正这种采样滞后，每个节点可以包含关于网络的所有布线状态的信息和关于哪个节点存储每个信道的信息，并且可以通过将在前一阶段存储的采样数据延迟一个采样而输出在前一阶段存储的采样数据，如从该节点看出的。

图 7a 示出当在从节点的帧接收器 401（参见图 4）处检测到前同步码时，为了引起“包接收发生事件”而进行的硬件处理。尽管图 7a 至图 9b 所示的处理因表示为流程图而看似软件处理，但是图 7a 至图 9b 所示的处理实际上是通过逻辑电路或数字信号处理器（DSP）执行的硬件处理。在步骤 701，从节点既能够进行接收从上游节点发送的包的位数据并收集对应于一个字节的上述位数据以激活图 7b 所示的接收事件处理这样的处理（接收处理），又能够进行在一定量的数据已经存储在其帧重构器 402 的缓冲器中的时刻开始将帧重构器 402 的缓冲器中的数据发送至下游节点这样的处理（发送处理）。这里，从节点在其前同步码部分终止的时刻还提供时序信号至产生采样时钟 Cs 的 PLL 振荡器（Fs 发生器），由此控制采样时钟的频率。

图 7b 示出在开始接收处理之后接收对应于一个字节的位数据时，从节点的帧数据发送/接收单元进行的硬件处理。尽管在本实例中基于字节处理接收到的数据，但是可以基于位或字处理接收到的数据。在步骤 702，加载接收到的 1 字节数据。在步骤 703，确定哪个时隙对应于接收到的 1 字节数据。如果接收到的 1 字节数据是报头（header）数据（图 3 中的“301”和“302”），

则在步骤 704 该 1 字节数据被写至帧重构器 402 的缓冲器，并执行对应于接收到的报头数据的处理。这里，通过发送处理，在达到一定量（几十至几百位）的数据保存在缓冲器中的时刻，通过接收事件处理被存储在帧重构器 402 的缓冲器中的数据通过帧发送器 403 被自动发送到下一个节点。因此，在上述接收事件处理中的“发送”处理是将待发送的数据写至缓冲器的处理。帧发送器 403 的发送是根据基于帧数据发送/接收单元的运行时钟产生的网络时钟而执行的。上述用于发送的网络时钟与帧接收器 401 提取的用于接收的网络时钟不同步。

当接收到的 1 字节数据是对应于节点的发送信道（图 4 中的信道 408）的音频数据时，在步骤 705，存储在音频发送缓冲器（图 4 中的音频输入缓冲器 407）中的一个字节被提取并被重写到帧重构器 402 的缓冲器中对应于接收到的 1 字节数据的位置，然后被从帧发送器 403 发送到下一个节点。当接收到的 1 字节数据是节点的接收信道（图 4 中的信道 405）的音频数据时，在步骤 706，该 1 字节数据被写至帧重构器 402 的缓冲器中的对应位置，然后在被加载到音频接收缓冲器（图 4 中的音频输出缓冲器 406）的同时，通过帧发送器 403 被发送到下一个节点。如果接收到的 1 字节数据是其它数据，例如，既非发送也非接收的信道的音频数据之类的数据，则在步骤 707 该 1 字节数据未经改变而被写至帧重构器 402 的缓冲器，然后被发送到下一个节点。

如果接收到的 1 字节数据是控制数据存储区（图 3 中的“304”）中的数据，则在步骤 708 确定节点是否具有发送数据权。如果节点没有发送权，则在步骤 709 该 1 字节数据未经改变而被写至帧重构器 402 的缓冲器，然后被发送到下一个节点。在步骤 709，该 1 字节数据还作为部分数据被加载，并且执行对应于该部分数据的处理。例如，如果部分数据是令牌的已划分数据并且节点需要获得发送权，则节点将分别接收到的多个已划分数据合并以重构令牌，由此获得发送权并删除写至缓冲器的令牌以防止其被发送到下一个节点。如果已划分数据是通过划分用于发送控制数据的发送数据包而产生的数据（以上参照图 3 所描述的），则节点将分别接收到的多个已划分数据合并以重构发送数据包。如果其目标地址为节点地址，则节点加载该发送数据包并提取包含在发送数据包中的控制数据，然后执行对应于控制数据的操

作。当节点在步骤 708 已经获得发送权时,则节点在步骤 710 将 D 发送缓冲器(其中存储待发送数据)中的 1 字节部分数据重写到帧重构器 402 的缓冲器中对应于接收到的 1 字节数据的位置,然后将其发送到下一个节点。在完成存储在 D 发送缓冲器中的所有数据的发送时,节点创建令牌并将其写至缓冲器中对应于控制数据存储区的位置,然后将其发送到下一个节点,从而释放发送权。如果存储在 D 发送缓冲器中的数据大于对应于控制数据存储区大小的 224 字节,则数据不能包含于一个包的控制数据存储区中,因此数据被划分为多个部分数据(每个部分数据小于 224 字节),然后通过被包含在多个连续采样周期的各个包的控制数据存储区中而被发送。

在步骤 704-707、709 和 710 之后,节点确定在步骤 711 接收到的 1 字节数据是否为最末字节。如果接收到的 1 字节数据是最末字节,则节点在步骤 712 执行终止发送/接收的处理。发送/接收终止处理包括与上述 FCS 纠错相关的一系列处理和在完成最末字节数据的发送时终止发送的处理。

图 8a 示出在主节点的帧接收器 401(参见图 4)处检测到前同步码时,为了引起“包接收发生事件”而进行的硬件处理。在步骤 801,主节点执行接收开始处理,并激活用以接收从系统的多个从节点发送的包的位数据和收集对应于一个字节的上述位数据的处理,以激活图 8b 所示的接收事件处理。从而,开始用以接收包的帧数据的处理。由于其它节点的采样时钟是基于在主节点处产生的采样时钟而产生的,因此在步骤 801 不必控制采样时钟  $C_s$  的频率。

图 8b 示出在开始接收处理之后接收对应于一个字节的位数据时,主节点的帧数据发送/接收单元进行的硬件处理。在步骤 802,加载接收到的 1 字节数据。在步骤 803,确定哪个时隙对应于接收到的 1 字节数据。步骤 804-810 类似于图 7b 所示的步骤 704-710。然而,在步骤 704-707、709 和 710,在达到一定量(几十至几百位)的数据保存在缓冲器中的时刻,从节点自动开始至下一个节点的发送,主节点不根据缓冲器中的数据量自动开始发送,而在等到一个采样周期终止之后(即在下一个采样周期的开始时刻)开始发送。因此,步骤 804-807、809 和 810 表示为“将 1 字节数据保存在缓冲器中”,而不是图 7b 所示的“将 1 字节数据写至帧重构器 402 的缓冲器”。此外,尽管接收到的帧数据是当前采样周期的帧数据,但是将由主节点发送的下一



个数据是下一个采样周期的帧数据。因此，主节点在将接收到的帧数据转换为下一个采样周期的帧数据的同时执行写入缓冲器的操作。步骤 811 和 812 类似于图 7b 所示的步骤 711 和 712。然而，在步骤 812，由于还没有开始发送，因此主节点仅执行接收终止处理。

图 8c 示出如何使用包含在主节点的帧重构器 402 中的缓冲器（帧数据队列缓冲器）。由于缓冲器“822”和“823”用于下文将描述的修改例，因此这里我们仅关注队列缓冲器 A821。队列缓冲器 A821 具有能够存储图 3 所示的一个帧数据的长度。在一个采样周期中经由各节点循环之后返回到主节点的帧数据被转换为下一个采样周期的帧数据，并且转换的帧数据被存储在队列缓冲器 A821 中。通过图 8b 所示的处理，上述帧数据预先被待重写入帧数据的采样或控制数据重写。因此，当到达下一个采样周期的开始时间时，使用提取指针 825，自队列缓冲器 A821 的头部开始，从队列缓冲器 A821 提取帧数据的位序列，并且提取的帧的位序列被依次发送到下一个节点。随着数据的提取，提取指针 825 前进，如箭头“824”所示，并且如果所有的帧数据已被提取，则提取指针 825 被初始化而指向队列缓冲器 A821 的头部。

另一方面，在预定采样周期中已经经由各节点循环并返回到主节点的帧数据的位序列，被转换为下一个采样周期的帧数据，并被依次保存在队列缓冲器 A821 中。上述保存是通过图 8b 所示的处理而执行的。具体来说，上述保存是通过重复执行如下处理而执行的：将数据写至保存指针 826 所表示的位置，然后使保存指针 826 前进，如箭头 824 所示。在返回的帧数据的所有位序列被保存在队列缓冲器 A821 中时，保存指针 826 被初始化，以指向队列缓冲器 A821 的头部。

当主节点在每个采样周期发送一个包以使其经由多个节点循环时，在主节点从队列缓冲器 A821 提取帧数据并开始将该帧数据发送至下一个节点之后，帧数据的报头在主节点完成帧数据的发送之前返回到主节点。这是当节点不是很多并且每个节点迅速完成其处理时帧数据在经由各节点循环之后返回到主节点的情况。当节点的数量很大时，帧数据的报头可在主节点完成帧数据的发送之后返回到主节点。在这种情况下，提取指针 825 看上去在保存指针 826 之前。此外，在返回到主节点的帧数据被完全保存在队列缓冲器 A821 中之前，下一个采样周期的开始时间可能到达而开始从队列缓冲器

A821 提取和发送数据。在这种情况下，保存指针 826 看上去在提取指针 825 之前。

图 9a 示出主节点中的采样时钟中断处理。主节点根据每个采样周期产生的中断来执行上述处理。在步骤 901，主节点使包序号 TN 的值增加。在步骤 902，主节点从图 8c 所示的队列缓冲器 A821 提取包序号为 TN-1 的包的帧数据，并用 TN 重写包序号，然后开始将帧数据发送到下一个节点。

图 9b 示出主节点中的 1 字节发送事件处理。在步骤 902 开始发送之后，主节点重复执行上述操作，直到队列缓冲器 A821 的帧数据的发送终止。首先，在步骤 911 处，主节点从队列缓冲器 A821 的由提取指针 826 指示的位置提取 1 字节数据，并使提取指针 826 前进。在步骤 912，主节点将该 1 字节数据发送到下一个节点。在步骤 913，主节点确定该 1 字节数据是否为最末字节，如果其为最末字节，则在步骤 914 执行终止发送的处理。

尽管在上述实施例中如图 7b 或图 8b 所示在发生 1 字节接收事件时采样数据或控制数据被重写，但是在发生 1 字节发送事件时采样数据或控制数据也可被重写。

尽管参照在一个采样周期中循环一个包（如图 5 所示）的实例描述了上述实施例，但是本发明也可以应用于在一个采样周期循环多个包的修改例。例如，如果根据 10Gbit Ethernet 标准而不是 1000BASE-T Ethernet 标准在节点之间进行通信，则在一个采样周期中可以循环大约 8 个包。在这种情况下，要求如下。

(1) 作为以上参照图 8c 描述的队列缓冲器，设置 8 个队列缓冲器 A821 至 H828，其依次用于存储 8 个包的循环帧数据。在一个采样周期的开始时间，主节点连续发送并循环 8 个包，在完成 8 个包的发送之后，主节点等待直到下一个采样周期的开始时间到达。当到达下一个采样周期的开始时间时，主节点开始发送接下来的 8 个包。一个采样周期中的多个包被分配每个采样周期中的各个包数 PN，其表示包的各个序号，如以上参照图 3 中的“302”描述的。也就是说，在本实例中，包数 PN 具有 1-8 范围内的值。

(2) 以与 PN=1 的包（即，一个采样周期的第一个包）的开始时间同步，每个从节点产生采样时钟。

(3) 在图 9a 的步骤 902 的中断处理中，从具有包序号“TN-8”的包（其

为从包“TN”起8个包之前的包)的帧数据创建具有包序号“TN”的包。

在上述实施例的级联连接中,主节点可以是中间节点,而不是级联连接的末端节点。例如,如果图1b所示的节点B是主节点,则在每个采样周期节点B首先将图3所示的包发送至节点C。然后,节点B将上述包(其按照节点B→节点C→节点D→节点C→节点B的顺序依次经过各节点之后返回到节点B)未经改变而发送至节点A,并基于按照节点B→节点A→节点B的顺序经过各节点之后返回到节点B的包创建下一个采样周期的包。

尽管在上述实施例中使用根据Ethernet标准的包格式,但是也可以使用根据除了Ethernet标准之外的其它标准的包格式。为了控制信号发送,可为每个节点配置IP地址。

在级联连接的情况下,每个从节点可对从下游节点返回的包(而不是从上游节点接收的包)执行一系列处理,例如报头处理、音频发送/接收以及控制数据发送/接收。

在上述实施例中,主节点在每个采样周期运行以基于前一帧数据生成当前采样周期的新帧数据,其中所述前一帧数据在当前采样周期之前的一采样周期中生成并馈送至网络,并且所述前一帧数据在经由多个从节点循环之后在生成新帧数据时返回至主节点。或者,主节点可以基于前一帧数据之前的一帧数据生成新帧数据,其中前一帧数据之前的一帧数据在当前采样周期之前的两个或更多采样周期中生成,并且前一帧数据之前的一帧数据在生成新帧数据时返回至主节点。在这种情况下,在要生成新帧数据时,先前的两个或更多采样周期中生成的采样数据可由主节点从头至尾完全接收。因此,主节点可以在生成新帧数据之前基于所接收帧数据的FCS对所接收帧数据进行错误检验。主节点仅当未从所接收帧数据中检测到错误时才基于所接收帧数据生成新帧数据。由此,能够减少或防止帧传送错误将导致的问题。

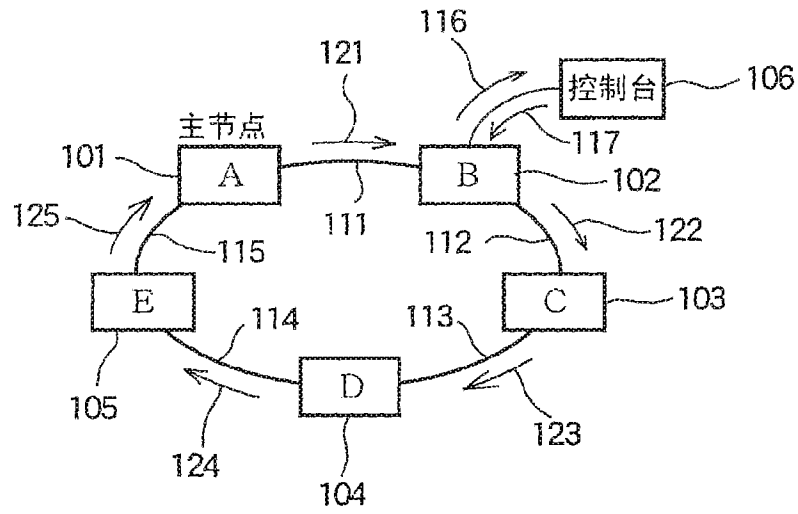


图1a

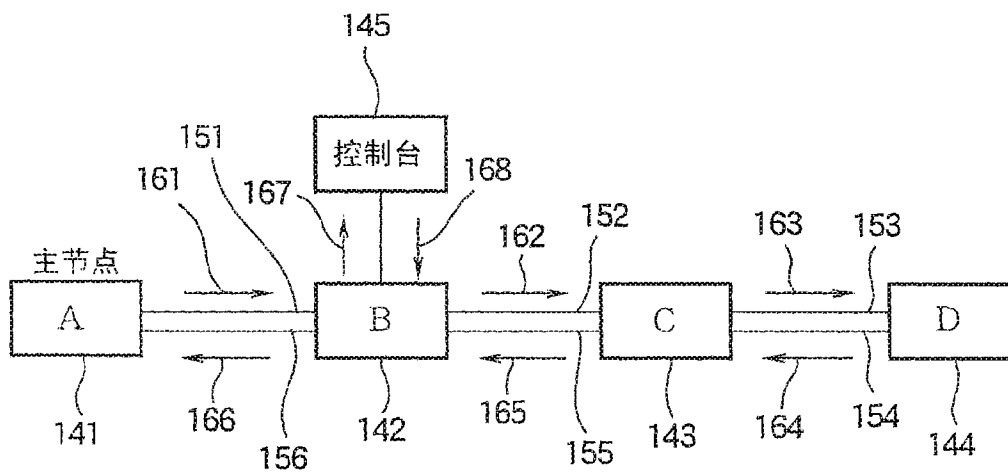


图1b

200710089081.7

说明书附图 第2/9页

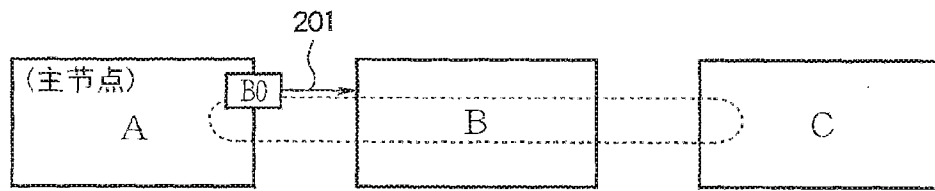


图2a

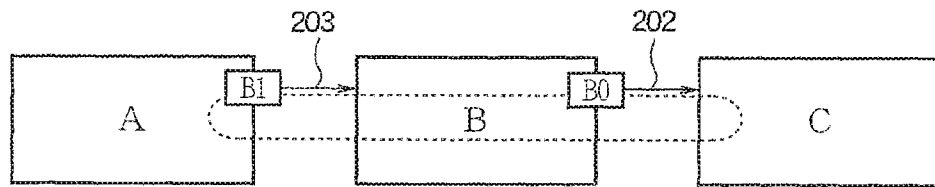


图2b

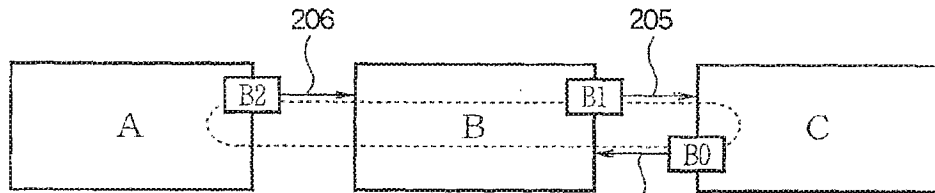


图2c

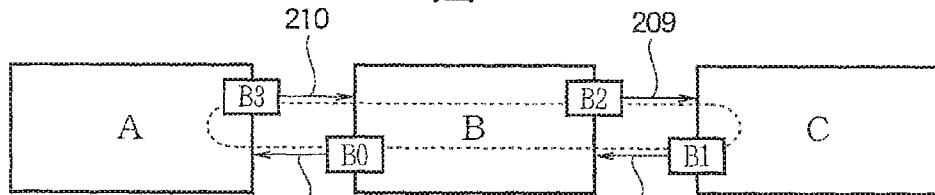


图2d

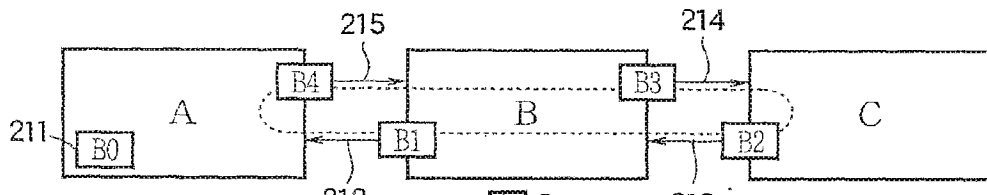


图2e

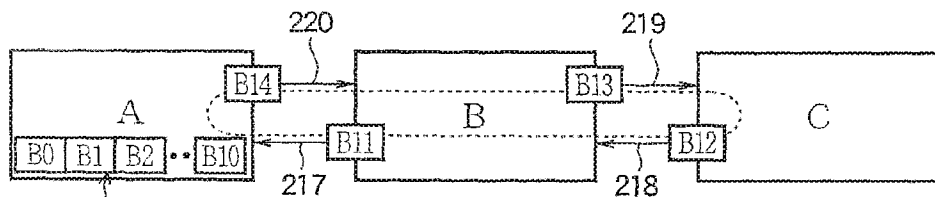


图2f

200710089081.7

说明书附图 第3/9页

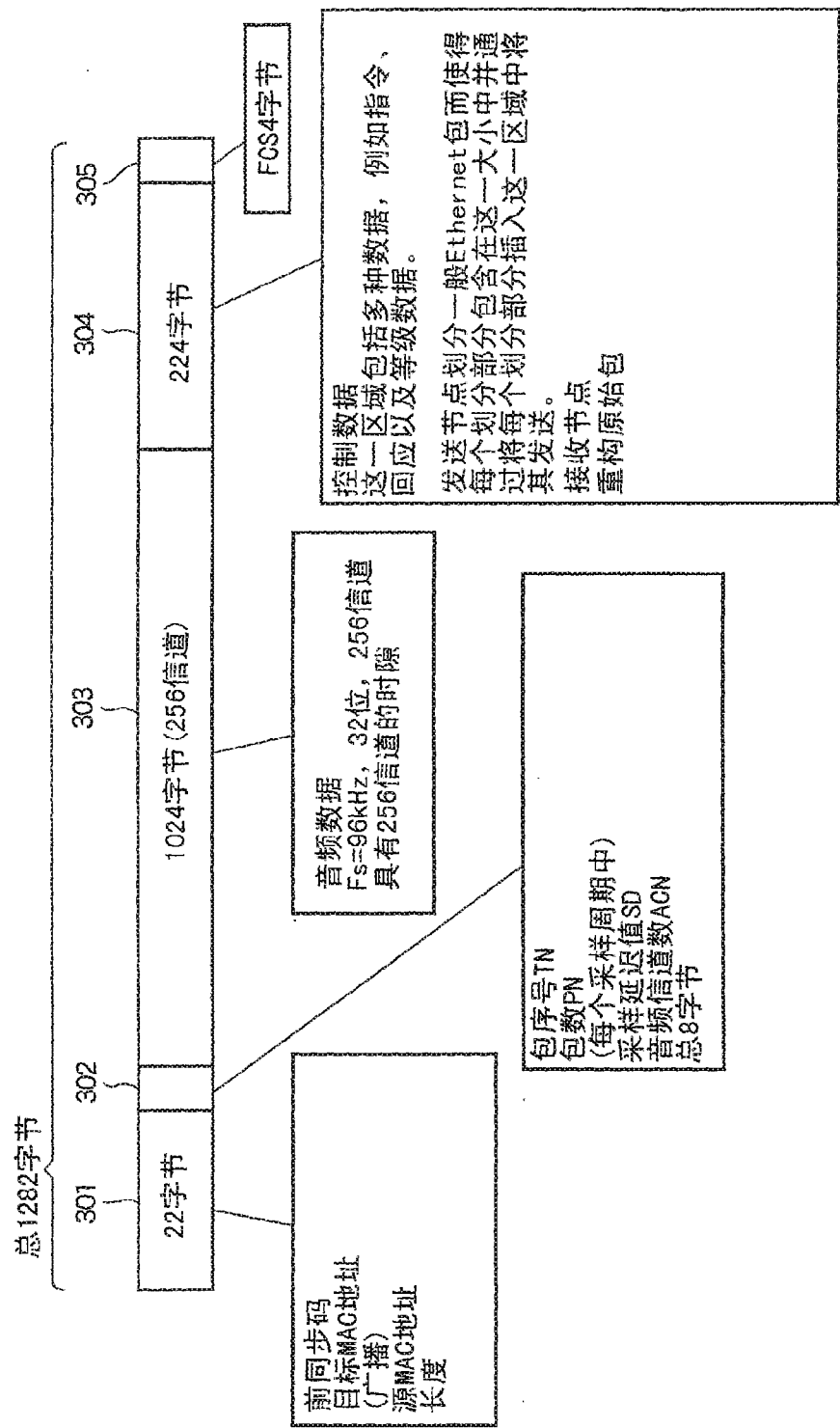


图3

200710089081.7

说明书附图 第4/9页

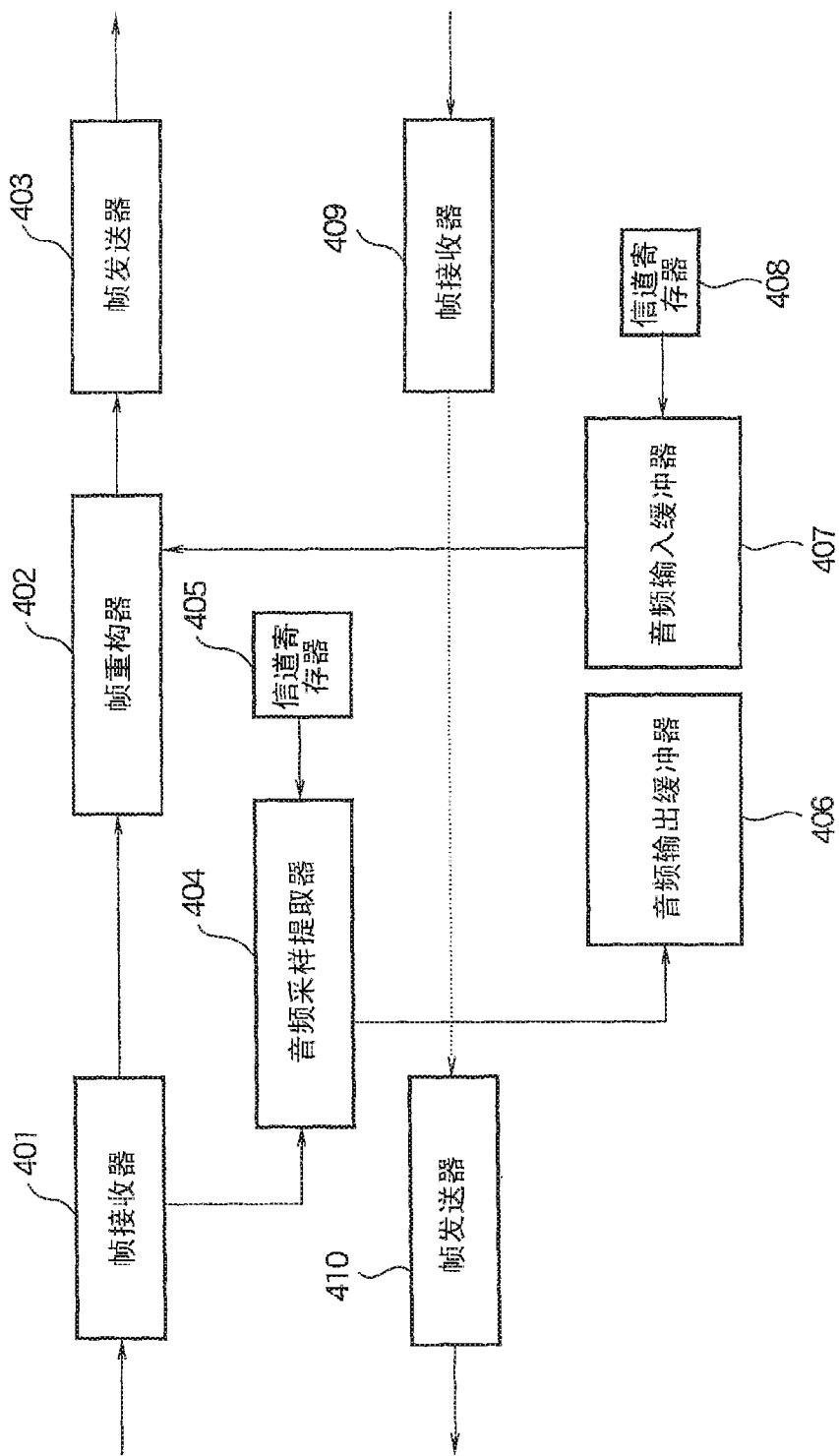


图4

200710089081.7

说明书附图 第5/9页

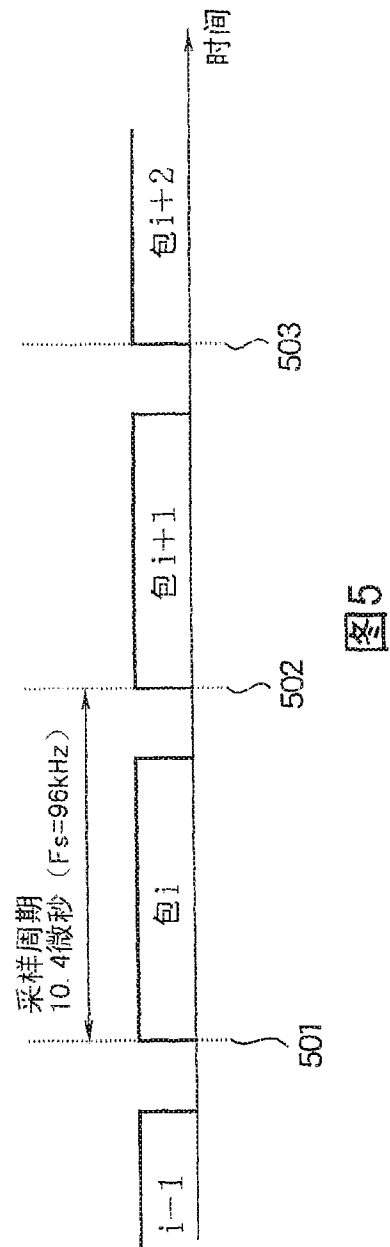


图5



200710089081.7

说明书附图 第6/9页

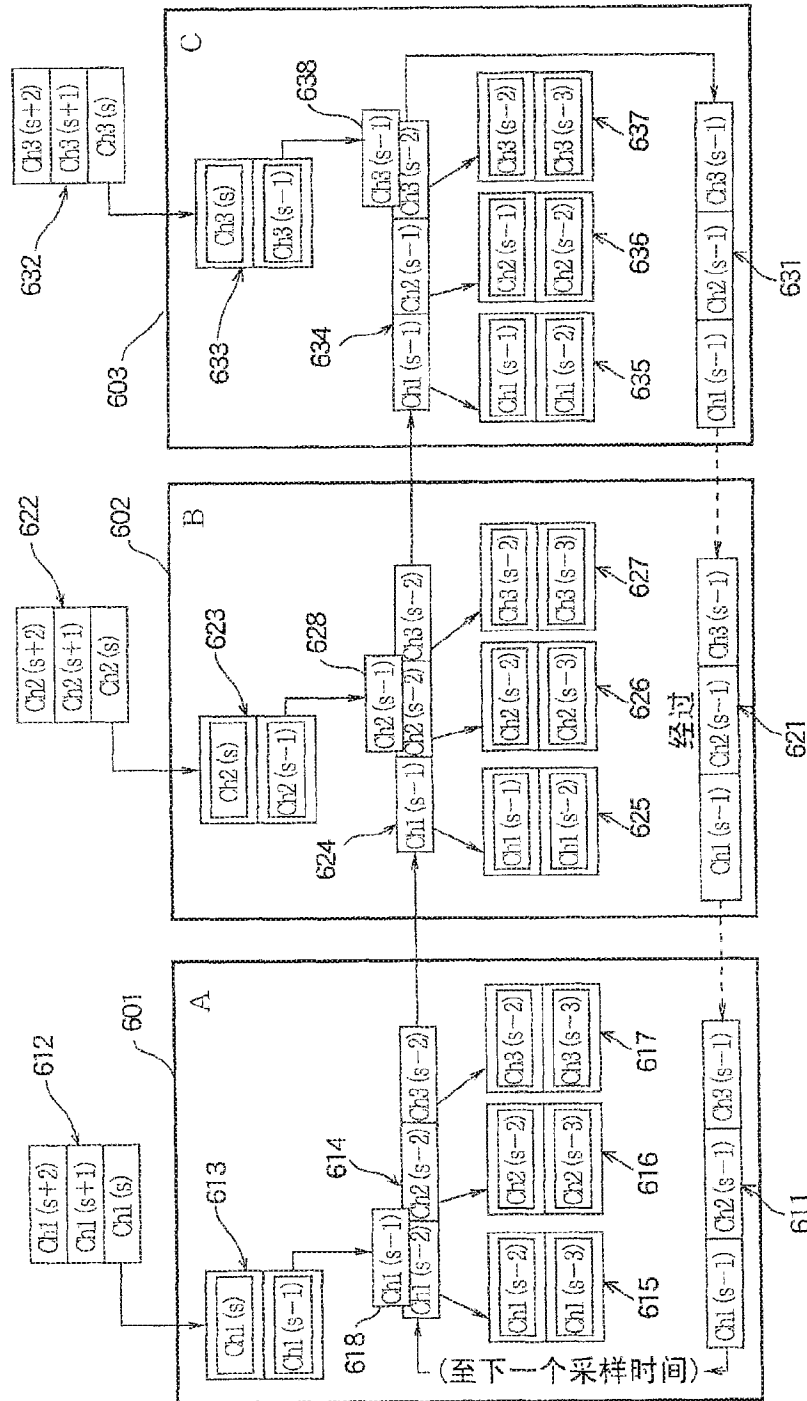
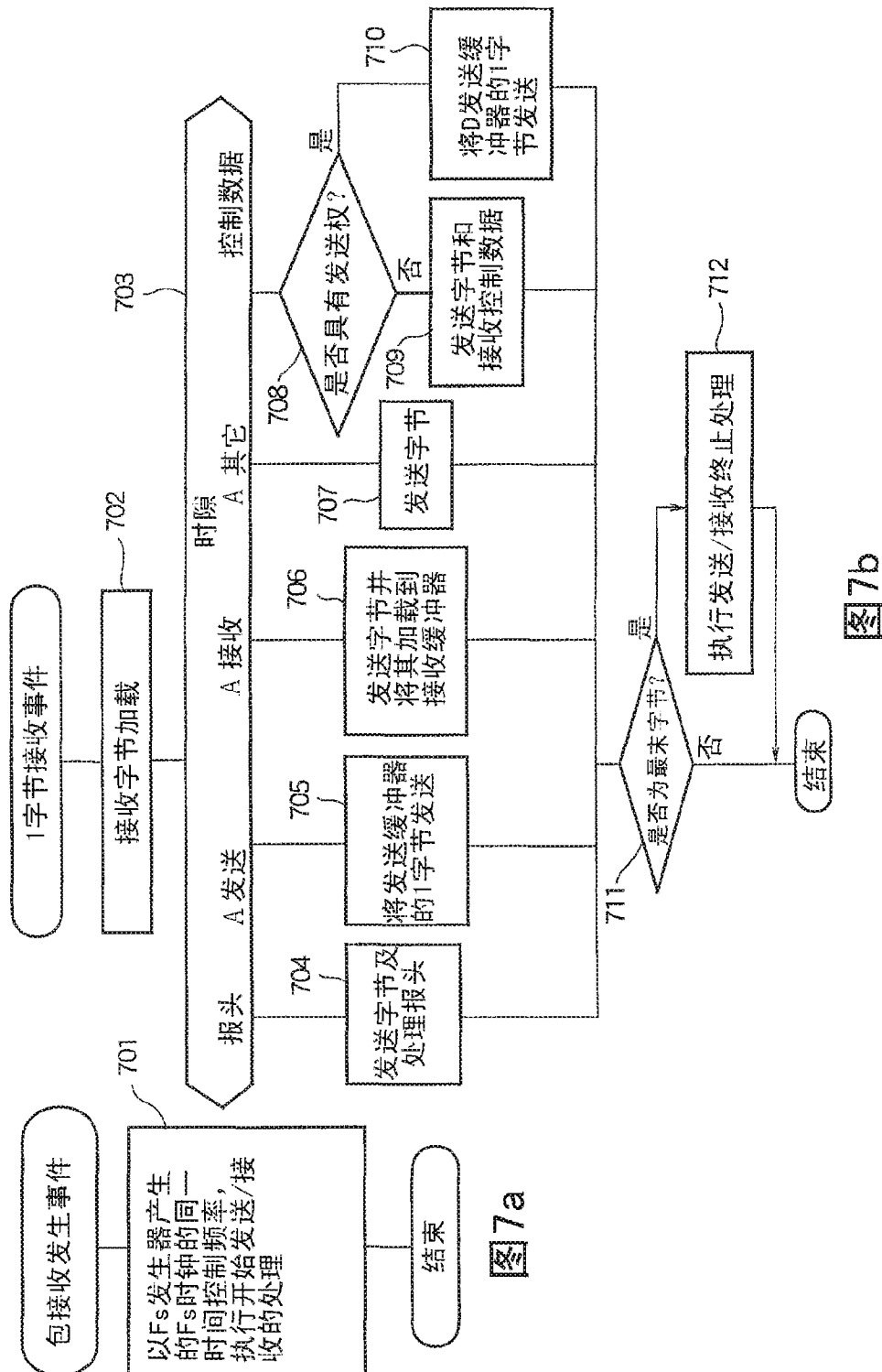
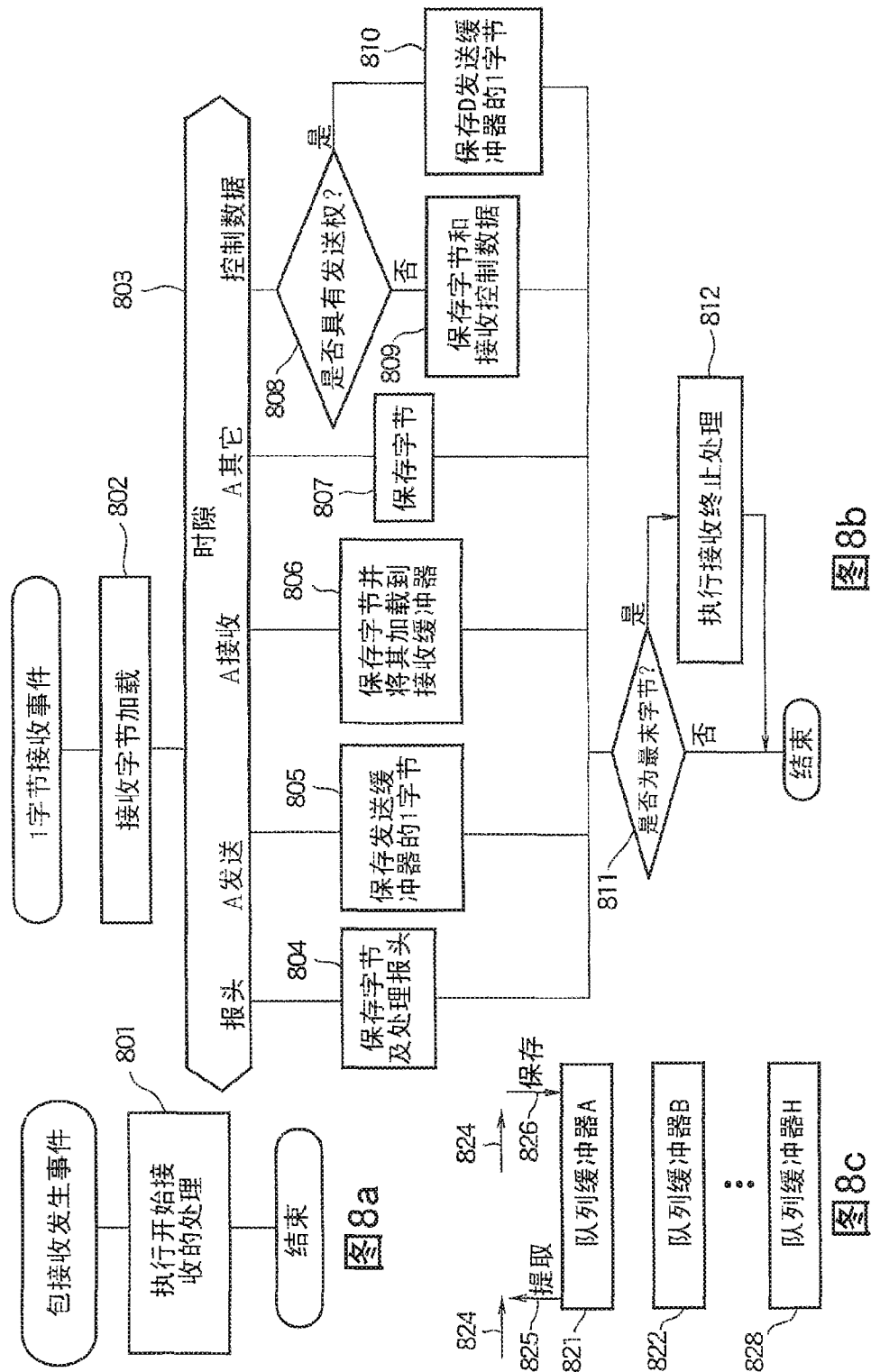


图6





200710089081.7

说明书附图 第9/9页

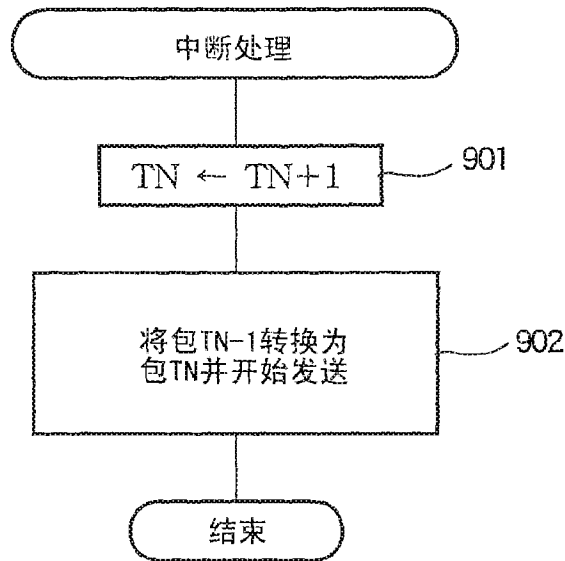


图9a

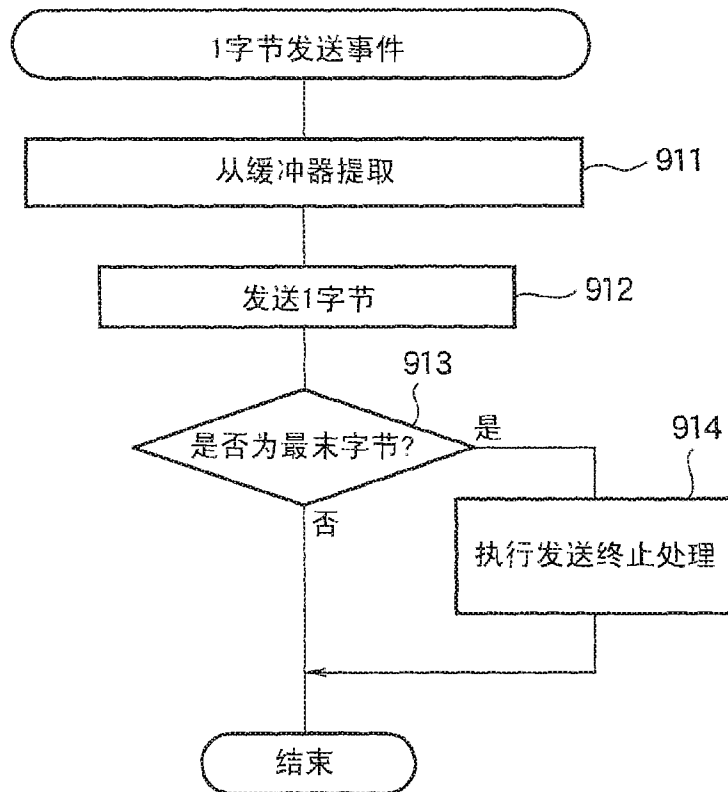
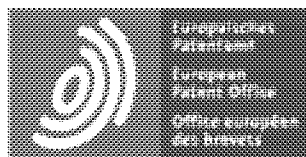


图9b



## Espacenet

CN101075896A System, method and device for using meeting connection expanding unlimited regional network

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CPC **H04L12/1813 (EP); H04L65/4038 (EP); H04L67/04 (EP); H04L67/16 (EP);  
H04L69/24 (EP); H04W4/80 (EP); H04L12/189 (EP); H04W84/18 (EP);  
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US2007264988A1; US2010110161A1; US7675537B2; US8368739B2**

System, method and device for using meeting connection expanding unlimited regional network

## Abstract

A system, method, and apparatus are disclosed whereby a wireless Personal Area Network (110,160) such as a Bluetooth piconet may be extended to a remote location beyond the normal range by means of a conferencing connection (145). The conferencing connection (145) may comprise, for example, one or more ISDN lines or an IP connection between two or more conference endpoints (100, 150). The broadband connection may include a video channel, an audio channel, a control channel, and a Bluetooth channel.

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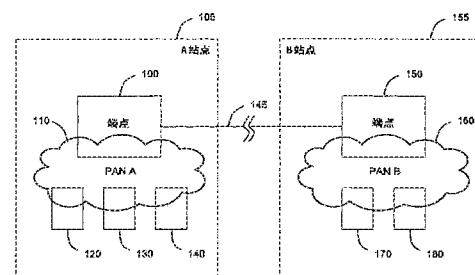
权利要求书 5 页 说明书 11 页 附图 3 页

[54] 发明名称

使用会议连接扩展无线个域网的系统、方法和装置

[57] 摘要

公开了一种系统、方法和装置，从而使无线个域网，例如蓝牙微微网，可以通过会议连接的方法扩展至比通常范围大的远程位置。该会议连接可以包括例如：在两个或多个会议端点之间的一个或多个 ISDN 线路或 IP 连接。该宽带连接可以包括视频信道、音频信道、控制信道和蓝牙信道。



1.一种扩展无线个域网（PAN）的方法，所述方法包括步骤：

建立第一无线个域网，所述第一无线个域网包括第一无线个域网使能设备和第一无线个域网使能会议单元；

在所述第一无线个域网使能会议单元和第二无线个域网使能会议单元之间建立会议连接，其中所述第二无线个域网使能会议单元位于远离所述第一无线个域网使能会议单元的位置；

建立第二无线个域网，所述第二无线个域网包括第二无线个域网使能设备和第二无线个域网使能会议单元；和

通过会议连接将所述第一无线个域网链接至所述第二无线个域网。

2.根据权利要求1所述的方法，其中所述第一无线个域网使能设备、所述第二无线个域网使能设备、所述第一无线个域网使能会议单元和所述第二无线个域网使能会议单元分别符合蓝牙规范。

3.根据权利要求1所述的方法，其中所述会议连接包括蓝牙信道。

4.根据权利要求1所述的方法，其中所述会议连接包括综合业务数字网线路。

5.根据权利要求1所述的方法，其中所述会议连接包括互联网协议连接。

6.根据权利要求1所述的方法，其中所述会议连接包括宽带连接。

7.根据权利要求1所述的方法，其中所述第一无线个域网使能会议单元包括视频会议单元。

8.根据权利要求1所述的方法，其中所述第一无线个域网使能会议单元包括音频会议单元。

9.一种扩展无线个人局域网（PAN）的方法，所述方法包括步骤：

建立第一无线个域网，所述第一无线个域网包括第一蓝牙使能设备和第一蓝牙使能视频会议单元；

建立第二无线个域网，所述第二无线个域网包括第二蓝牙使能设备和第二蓝牙使能视频会议单元，其中所述第二蓝牙使能视频会议单元位于远离所述第一蓝牙使能视频会议单元的位置；

在所述第一蓝牙使能会议单元和所述第二蓝牙使能视频会议单元之间建立视频会议连接；和

通过所述视频会议连接将所述第一无线个域网链接至所述第二无线个域网。

10.根据权利要求 9 所述的方法，其中所述视频会议连接包括音频信道、视频信道、控制数据信道和蓝牙信道。

11.根据权利要求 9 所述的方法，其中所述视频会议连接包括综合业务数字网线路。

12.根据权利要求 9 所述的方法，其中所述视频会议连接包括互联网协议连接。

13.根据权利要求 9 所述的方法，其中所述视频会议连接包括宽带连接。

14.一种通过无线个域网（PAN）交换数据的方法，所述方法包括步骤：

建立第一无线个域网，所述第一无线个域网包括第一无线个域网使能设备和第一无线个域网使能视频会议单元；

建立第二无线个域网，所述第二无线个域网包括第二无线个域网使能设备和第二无线个域网使能视频会议单元，其中所述第二无线个域网使能视频会议单元位于远离所述第一无线个域网使能视频会议单元的位置；

在所述第一无线个域网使能会议单元和所述第二无线个域网使能会议单元之间建立视频会议连接；

通过所述视频会议连接将所述第一无线个域网链接至所述第二无线个域网；

分别确定所述第一无线个域网使能视频会议单元和所述第二无线个域网使能视频会议单元的性能；

识别所述第一无线个域网中的一个或多个设备；

识别所述第二无线个域网中的一个或多个设备；和

从所述第一无线个域网使能设备向所述第二无线个域网使能设备发射数据。

15.根据权利要求 14 所述的方法，其中从所述第一无线个域网使能设备向所述第二无线个域网使能设备所发射的数据包括电子商务卡。

16.根据权利要求 14 所述的方法，其中从所述第一无线个域网使能设备向所



述第二无线个域网使能设备所发射的数据包括绘制在蓝牙使能白板上的图像。

17.根据权利要求 14 所述的方法,其中从所述第一无线个域网使能设备向所述第二无线个域网使能设备所发射的数据包括使用蓝牙使能笔所绘制的图像。

18.根据权利要求 14 所述的方法,其中从所述第一无线个域网使能设备向所述第二无线个域网使能设备所发射的数据包括绘制在个人数字助理上的图像。

19.一种通过虚拟个域网(PAN)实现无线通信的会议系统,所述系统包括:

第一无线个域网,所述第一无线个域网包括第一个域网使能会议单元、第一个域网使能设备和第二个域网使能设备;和

第二无线个域网,所述第二无线个域网包括第二个域网使能会议单元、所述第一个域网使能设备和所述第二个域网使能设备;

其中所述第一个域网使能会议单元和所述第一个域网使能设备位于第一位置;

其中所述第二个域网使能会议单元和所述第二个域网使能设备位于第二位置,该第二位置在物理上远离所述第一位置;和

其中所述第一个域网使能会议单元和所述第二个域网使能会议单元能够通过会议连接进行通信。

20.根据权利要求 19 所述的系统,其中所述会议连接包括蓝牙信道。

21.根据权利要求 19 所述的系统,其中所述会议连接包括综合业务数字网线路。

22.根据权利要求 19 所述的系统,其中所述会议连接包括互联网协议连接。

23.根据权利要求 19 所述的系统,其中所述会议连接包括宽带连接。

24.根据权利要求 19 所述的系统,其中所述第一个域网使能设备包括个人数字助理。

25.根据权利要求 19 所述的系统,其中所述第一个域网使能设备包括个人电脑。

26.根据权利要求 19 所述的系统,其中所述第一个域网使能设备包括移动电话。

27.根据权利要求 19 所述的系统,其中所述第一个域网使能设备包括摄像机。

28.根据权利要求 19 所述的系统,其中所述第一个域网使能设备包括麦克

风。

29.根据权利要求 19 所述的系统,其中所述第一个域网使能设备包括扬声器。

30.根据权利要求 19 所述的系统,其中所述第一个域网使能设备包括蓝牙白板。

31.根据权利要求 19 所述的系统,其中所述第一个域网使能设备包括蓝牙笔。

32.根据权利要求 19 所述的系统,其中所述第一个域网使能设备包括打印机。

33.根据权利要求 19 所述的系统,其中所述第一个域网使能设备包括鼠标。

34.根据权利要求 19 所述的系统,其中所述第一个域网使能设备包括键盘。

35.根据权利要求 19 所述的系统,其中所述第一个域网使能会议单元包括视频会议单元。

36.根据权利要求 19 所述的系统,其中所述第一个域网使能会议单元包括音频会议单元。

37.一种近端的会议端点,所述会议端点包括:  
处理器;

与所述处理器耦合的接口,其中所述接口被构造为通过会议链路向位于远端的远程端点发送和接收音频数据、控制数据和蓝牙数据;和

通过串行链路与所述接口耦合的蓝牙模块,其中所述蓝牙模块被构造为无线地向和从近端蓝牙使能设备发送和接收数据。

38.根据权利要求 37 所述的会议端点,进一步包括具有用于拨打电话号码的计算机可执行指令的计算机可读介质,其中从近端蓝牙使能设备无线地接收所述电话号码。

39.根据权利要求 37 所述的会议端点,进一步包括具有用于向远端蓝牙使能设备发送电子商务卡的计算机可执行指令的计算机可读介质,其中从近端蓝牙设备无线地接收所述电子商务卡。

40.根据权利要求 37 所述的会议端点,进一步包括具有用于向远端蓝牙使能设备发送图像的计算机可执行指令的计算机可读介质,其中从近端蓝牙使能设备无线地接收所述图像。

41.根据权利要求 37 所述的会议端点,进一步包括具有用于向远端蓝牙使能打印机发送文件的计算机可执行指令的计算机可读介质,其中从近端蓝牙使能设备无线地接收所述文件。

42.根据权利要求 37 所述的会议端点,进一步包括具有计算机可执行指令的计算机可读介质,用于将存储在近端蓝牙使能设备上的第一组数据与存储在远端蓝牙设备上的第二组数据同步。

43.一种位于第一站点的视频会议单元,所述视频会议单元包括:

处理器;

与所述处理器耦合的接口,其中所述接口被构造为通过会议链路向位于远离所述第一站点的第二站点的端点发送和接收音频数据、视频数据和蓝牙数据;和

通过串行链路与所述接口耦合的蓝牙模块,其中所述蓝牙模块被构造为无线地向和从位于所述第一站点的蓝牙使能设备发送和接收数据。

44.根据权利要求 43 所述的视频会议单元,进一步包括具有用于拨打视频号码的计算机可执行指令的计算机可读介质,其中从位于第一站点的蓝牙使能设备无线地发射所述视频号码。

45.根据权利要求 43 所述的视频会议单元,进一步包括具有用于向位于所述第二站点的蓝牙使能设备发送电子商务卡的计算机可执行指令的计算机可读介质,其中从位于第一站点的蓝牙使能设备无线地接收所述电子商务卡。

46.根据权利要求 43 所述的视频会议单元,进一步包括具有用于向位于所述第二站点的蓝牙使能设备发送图像的计算机可执行指令的计算机可读介质,其中从位于第一站点的蓝牙使能设备无线地接收所述图像。

47.根据权利要求 43 所述的视频会议单元,进一步包括具有用于向位于所述第二站点的蓝牙使能打印机发送文件的计算机可执行指令的计算机可读介质,其中从位于第一站点的蓝牙使能设备无线地接收所述文件。

48.根据权利要求 43 所述的视频会议单元,进一步包括具有计算机可执行指令的计算机可读介质,用于将存储在位于第一站点的蓝牙使能设备上的第一组数据与存储在位于第二站点的蓝牙使能设备上的第二组数据同步。

## 使用会议连接扩展无线个域网的系统、方法和装置

### 技术领域

本发明涉及会议，尤其是，涉及通过使用会议连接来扩展无线微微网 (piconets) 或无线个域网 (PANs) 的范围。

### 背景技术

音频会议和视频会议能够使在地理上相隔很远的个人或集体在其各自的位置相互通信。会议通过减少了个人旅行会面所需要的时间和花费而起到了重要的作用。因此，电话会议在组织内部或组织之间实现了增长的利润率、生产率和效率。同时，会议还使公司能够加速做出决定，和对分散的部门授权。会议在商业、医疗、教育和政府领域尤其有用。

在音频会议中，免提式电话机是作为用于实现在两方或多方的参与者之间的音频通信的端点设备的一个例子。可以在 POLYCOM® SOUNDSTATION® 的产品线中找到免提式电话机的例子。视频会议还具有另外的能力，能够通信图形信息和观看位于远处的与会者的面部表情和肢体语言。视频会议提供了面对面进行通信的好处，且不产生与旅程有关的不便、花费和不确定性。可以在 POLYCOM® VIEWSTATION® 的产品线中找到视频会议单元的例子。

经常希望在会议期间与远程的与会者共享数据。视频会议与协作，和数据共享与协作一起，日益使分散的机构能够将其人力和信息资源集中在一起，以产生新的工作和交互方式。视频会议系统可以提供丰富有效的协作环境，即使参与者可能相隔数千英里。

### 发明内容

无线设备正日益变得普及。线路的消失提供了灵活性和移动性，并且消除了混乱。大量的无线设备被用于世界范围的无线技术和标准。但是，当前的无线技术，例如蓝牙、802.11 和 IR（红外），都限于在严格的范围之内使用。

因此，产生了对提供能克服上述现有技术缺点的会议解决方案的需求。本发明的实施例有利地将长距离音频和视频会议的特点与短距离无线技术的特点结合在一起。

视频会议单元在该视频会议单元的附近建立了无线微微网。当加入到与远程一个或多个会议单元的音频或视频会议中时，该微微网可以被扩展到包括使用由该视频会议系统所采用的数据信道的远程位置。以这种方式，任何一个与该会议单元进行无线通信的设备可以连接到该远程微微网，以通过会议连接接收和/或发射数据。本发明的实施例提供了允许虚拟物理临近的蓝牙桥。

因此，在语音或视频会议期间，有利地提供了另一种通信模式，其中远程设备可以如同在相同的房间内一样进行无线通信。例如，近端的无线设备可以将数据无线发射至近端的视频会议单元，该视频会议单元将该数据通过会议连接发送至远端会议单元，该远端会议单元将该数据无线发射至远端无线设备。这种经无线发射的数据的例子包括电子商务卡、图像、蓝牙笔数据、蓝牙白板数据、电话号码、视频号码、日历数据、地址簿数据、键盘数据、鼠标数据、来自无线麦克风的音频、去往无线扬声器的音频等。从而，本发明的实施例增进和加强了位于远程的用户之间的协作。

#### 附图说明

图 1 描绘了根据本发明一个实施例的会议系统的方框图。

图 2 描绘了根据本发明一个实施例的典型视频会议的方框图。

图 3 描绘了根据本发明一个实施例的典型视频会议的方框图。

#### 具体实施方式

现在参考图 1 进行描述，图 1 描绘了位于第一物理位置 105 (A 站点) 的无线网络使能会议端点 100。端点 100 可以包含无线网络使能 (wireless-network-enabled) 视频会议单元 (VCU)。图 3 描绘了一个适合的视频会议单元的典型方框图。在其它的实施例中，端点 100 可以包含不具有视频功能的无线网络使能音频会议单元。例如，端点 100 可以包括无线网络使能免提式电话机，该免提式电话机包括图 3 的 VCU 的部件，但不包括任何视频信道、视频编码器、视频解码器、视频监视器和视频摄像机。



端点 100 能够与一个或多个相似的使能设备 120、130 和 140 建立射频个域网 110 (PAN A)。在一些实施例中,所述一个或多个设备 120、130 和 140 可以包括能够根据蓝牙标准进行短距离无线通信的蓝牙使能设备。所述一个或多个设备 120、130 和 140 可以包括例如个人数字助理 (PDA)、移动电话、打印机、膝上电脑、显示设备、放映机、照相机、蓝牙白板、蓝牙笔、扬声器、麦克风、耳机、键盘、鼠标的设备,以及其他任何能够在 PAN 中无线通信的设备。PAN A110 并不限于蓝牙微微网,可以是例如包括超宽频带 (“UWB”) 网络,或其他合适的网络。在其它的实施例中,可以使用红外 (IR) 或 802.11 通信。

图 1 还示出了在远离位置 105 (A 站点处) 的物理位置 155 (B 站点处) 的无线网络使能会议端点 150。端点 150 可以包括无线网络使能视频会议单元 150。在图 3 中描绘了适合的视频会议单元的典型方框图。在其它的实施例中,端点 150 可以包括不具有视频能力的无线网络使能音频会议单元。例如,端点 150 可以包括无线网络使能免提式电话机,该免提式电话机包括图 3 的 VCU 的部件,但不包括任何视频信道、视频编码器、视频解码器、视频监视器和视频摄像机。

在一个实施例中,端点 100 和 150 能够通过会议连接 145 进行音频视频 (AV) 和数据通信。该会议连接 145 可以包括视频信道、音频信道、控制信道和蓝牙信道。该会议连接 145 可以包括例如,一个或多个 ISDN (综合业务数字网) 线路、通过局域网 (LAN)、广域网 (WAN) 或互联网,或其它任何合适的数据通信方式连接,例如光纤连接、微波或卫星链路等的互联网协议 (IP)。可以采用任何基于 IP 的标准,无论是已知的还是之后所提出的。其中,当前已知的基于 IP 的标准的例子包括但不限于实时传输协议 (RTP)、实时流协议 (RTSP)、会话初始协议 (SIP)、H 系列 (如, H.323 和 H.324 等) 和 T 系列 (如, T.120 等)。在其它的音频会议使能而视频会议非使能的实施例中,会议连接 145 可以包括例如 VoIP (通过互联网协议的语音)、SIP 或 ISDN 连接。

端点 150 能够与一个或多个设备 170 和 180 建立无线个域网 160 (PAN B)。PAN B160 可以包括蓝牙微微网。该一个或多个设备 170 和 180 可以包括,例如,能够使用蓝牙系统进行短距离无线通信的蓝牙使能设备。该一个或多个设备 170 和 180 可以包括例如个人数字助理 (PDA)、移动电话、打印机、膝上电脑、显示设备、放映机、摄像机、蓝牙白板、蓝牙笔、扬声器、麦克风、耳机、键盘、鼠标的设备,以及其他任何能够在 PAN 中无线通信的设备。

通过使用连接 145, PAN A 110 可以链接至 PAN B 160, 这样, 设备 120、130、140、170 和 180 (和任何其他能够加入 PAN A 或 PAN B 的设备) 可以相互进行数据通信。从而, 会议连接 145 实现了远在几百或几千英里之外的设备的虚拟物理临近。

尽管图 1 描绘了点对点会议系统, 但是该系统可以升级以提供多点会议, 在该多点会议中通过连接 145 链接其它的视频会议单元。连接 145 可以包括多点控制单元 (MCU), 以使得多个视频会议单元能够加入到单独的视频会议中。例如, 在三方会议中, 在该会议中的每个 PAN 都包括蓝牙微微网, 在每个 PAN 中的设备的最大数量增至三倍。

蓝牙是用于在移动 PC、移动电话、外围设备和其它便携式设备之间的小型组建规模、低成本、短距离无线链路的标准和规范。与传统的无线操作网不同, 蓝牙微微网不需要接入点, 与红外通信 (例如, 由 IrDA 标准) 不同, 蓝牙不需要视线连接。

蓝牙设备可以工作于电路交换模式和分组交换模式。电路交换模式是语音通信最通常使用的模式, 而分组交换模式通常优选用于互联网数据和更高带宽移动通信系统。

蓝牙个人局域网包括一个主设备和多达七个从设备, 从而在有限的范围内 (例如, 10 米) 实现多达八个设备的相互连接。在称为设备发现 (Device Discovery) 的过程中, 所述主设备通过广播请求来寻找设备; 处在 “可发现” 状态中的从设备使用其识别码进行应答。对于需要额外安全的用户和应用可以提供数据加密。

蓝牙描述文件 (profile) 是所公开的对特定使用实现蓝牙无线技术的规定。描述文件是由设备所提供的 “服务”。为了使两个蓝牙使能设备能够共同操作以完成用户任务, 这两个设备必须都完成一组通常的描述文件。

由蓝牙连接所发射的信号可以是半双工或全双工。蓝牙微微网中的全双工链路可以以大于 64Kbps 的速率发送数据, 足够容纳若干语音信道的速率。半双工链路可以以在一个方向上是 721 千比特每秒, 在另一个方向上是 57.6Kbps 的数据速率来建立。如果需要在两个方向上都具有相同速率的半双工链路, 可以使用在每个方向上为 432.6Kbps 的链路。

与许多其它的无线标准不同, 蓝牙无线规范包括链路层和应用层定义两者,

以用于支持数据、语音和文本中心应用的产品开发者。

在蓝牙规范中进一步描述了蓝牙协议架构。可以在<http://www.bluetooth.com> 找到最近的蓝牙规范 Rev v2.0 +EDR, 2004 年 11 月 4 日公布, 在此引入该规范作为参考。但是, 本发明的各种实施例的原理可以使用之前和以后版本的蓝牙规范。

该蓝牙规范可以被描述为具有以蓝牙无线层作为基础的协议栈。该无线层定义了对在 2.4GHz ISM(工业、科学和医疗)频段工作的蓝牙收发信机的要求。参与功率-控制链路的收发信机必须能够测量其自身的接收机信号强度, 并确定在该链路另一侧的发射机是否应该增大或降低其输出功率电平。其使用接收信号强度指示符 (RSSI) 来实现。在 LMP (链路管理协议) 链路中承载用于改变发射机功率的指令。

在蓝牙栈中, 在所述无线层之上是基带层, 该基带层描述了执行基带协议和其它低级链路事务的蓝牙链路控制器 (LC) 的规范。该基带是蓝牙栈的物理层。其管理除其它服务之外的物理信道和链路, 所述其它服务例如是误差校正、数据白化、跳选择和蓝牙安全。所述基带协议作为链路控制器而实现, 其与链路管理器一起工作以执行链路级事务, 例如链路连接和功率控制。该基带还管理异步和同步链路, 处理分组和进行寻呼, 并询间接入和询问该区域中的蓝牙设备。该基带收发信机使用时分双工 (TDD) 结构 (交替发射和接收)。因此, 除了不同的跳率 (频分), 时间也被划分。

为蓝牙系统的基带层定义了十三种不同的数据包类型。每个数据包包括三个实体: 访问码 (68/72 比特)、报头 (54 比特) 和有效载荷 (0-2745 比特)。存取码用于定时同步、偏移补偿、寻呼和询问。报头包含用于报头的数据包确认、乱序数据包重排的数据包编号、流控制、从设备地址和错误校验的信息。数据包有效载荷可以包含语音字段、数据字段或两者都有。如果具有数据字段, 则有效载荷还包含有效载荷报头。

蓝牙控制器以两种主要的状态操作: 等待和连接。还有七个子状态用于在微微网中添加从设备或建立连接。这些状态是: 寻呼、寻呼扫描、询问、询问扫描、主设备响应、从设备响应和询问响应。等待状态是在蓝牙单元中的默认低功率状态。仅运行其内部时钟, 并且不与其它设备交互。在连接状态, 主设备和从设备可以使用信道 (主设备) 访问码和主设备蓝牙时钟来交换数据包。



所述链路管理器完成链路设置、验证、链路配置和其它协议。其发现其它的远程链路管理器，并通过链路管理协议（LMP）与之通信。为了完成其服务提供者的任务，该链路管理器使用底层链路控制器（LC）的业务。

该链路管理协议主要包括多个 PDU（协议数据单元），该 PDU 从一个设备向另一个设备发送，并由数据包报头中的 AM\_ADDR 来确定。链路管理器 PDUs 通常以单独时隙的数据包进行发送，因此有效载荷的报头为一字节。

当在两个蓝牙设备之间已经建立了连接时，该连接包括 ACL 链路。之后可以建立一个或多个 SCO 链路。

每个蓝牙链路都具有用于链路监视的定时器。该定时器用于检测由设备移出范围、设备电源耗尽或其它相似的故障所造成的链路损耗。使用 LMP 步骤用于设置监视超时的值。

主机控制器接口（HCI）向基带链路控制器和链路管理器提供命令接口，并且访问硬件状态和控制寄存器。其提供进入蓝牙基带能力的通用命令方法。该 HCI 链路命令向主机提供控制与其它蓝牙设备连接的链路层的功能。上述命令使链路管理器能够与远程蓝牙设备交换 LMP 命令。

逻辑链路控制和自适应协议（L2CAP）在该蓝牙栈中的基带协议之上，并驻留于数据链路层中。其支持更高级协议复用、数据包分割和重组及服务质量信息的传输。L2CAP 允许更高级协议和应用以发射和接收长度多达 64 千字节的数据包。同时支持同步面向连接（SCO）链路和异步无连接（ACL）链路。L2CAP 是基于数据包的，但是遵循基于信道的通信模型。信道代表在远程设备中的 L2CAP 实体之间的数据流。信道可以是面向连接或无连接的。L2CAP 依赖由基带中的链路管理器层所提供的流控制机制。

RFCOMM 协议在 L2CAP 协议之上提供 RS-232 系列端口的仿真。存在两种 RFCOMM 可适应的设备类型：类型 1 设备（通信端点，例如计算机和打印机）；和类型 2 设备（通信段的一部分，例如调制解调器）。在类型 1 设备上，一些端口驱动器必须提供如其所仿真的 API 所规定的流控制业务。例如，一个应用可能会请求特定的流控制机制，例如 XON/XOFF 或 RTS/CTS，并要求该端口驱动器处理该流控制。在类型 2 设备上，该端口驱动器可能需要在通信路径，即物理 RS-232 端口的非 RFCOMM 部分上执行流控制。

业务发现协议（SDP）为应用提供了发现蓝牙设备所提供或通过蓝牙设备

可获得的业务的方法。其还允许应用来确定上述可获得的业务的特性。在蓝牙环境中要求的特定业务发现协议,因为所获得的一组服务是基于可能正在运动中的蓝牙使能设备的 RF 临近区域而动态变化的。SDP 使用请求/响应模型,其中每个事务(transaction)都包含一个请求协议数据单元(PDU)和一个响应 PDU。每个 SDP PDU 都包括 PDU 报头,在该 PDU 报头之后是 PDU-特定参数。该报头包含三个字段: PDU ID,标识 PDU 的类型;事务 ID 字段,唯一地标识请求 PDU,从而使响应 PDU 与请求 PDU 相匹配;和参数长度字段,说明包含在该 PDU 中的所有参数的长度(按字节)。

SDP 使蓝牙使能设备能够发现其它能够以业务方式所提供的蓝牙使能设备。寻找任何所提供的业务的过程通常称作“浏览”;“搜索”通常指寻找特定的业务。在 SDP,浏览业务的机制是基于由所有称作业务等级所共享的称为浏览组名单属性的属性。该属性的值包括全球唯一标识符(UUIDs)的列表。所述每个 UUID 代表与业务相关的用于浏览目的的浏览组。

现在参考图 2,图 2 描绘了根据本发明一个实施例的典型视频会议系统的方框图。在图 2 的例子中,会议室 A 中的视频会议单元 200 能够与该会议室 A 中的各种蓝牙使能设备建立射频 PAN。在该例中,在会议室 A 的 PAN 中的蓝牙使能设备包括打印机 220、PDA 230 和蜂窝电话 240。在该会议室 A 的 PAN 中还可以包括其它的蓝牙使能设备,包括但不限于上述与图 1 有关的设备。

在图 2 中描绘了视频会议单元 200 的各个层,包括无线层 202、硬件层 204、HCI 层 206、L2CAP 层 208、其它蓝牙栈部分 210 和应用层 212。还可以包括其它的层,例如在蓝牙规范中所描述的,但是为了简洁起见没有表示。

网络接口(NI) 214 通过信道 216 与 HCI 层 206 链接。该网络接口 214 可以根据 H.323 标准操作,用于基于 IP 的网络,包括互联网的音频、视频和数据通信。该网络接口 214 还可以根据 H.320 标准操作,用于 ISDN 视频会议。该网络接口 214 还可以根据其它的标准和协议操作,不论是当前已知的还是今后所开发的。根据本实施例,信道 216 可以包括用于发送和接收蓝牙数据的专有 RTP 信道。

在会议室 A 中的视频会议单元 200 能够通过宽带连接 245 向和从在会议室 B 中的视频会议单元 250 发送和接收音频、视频和数据,该会议室 B 远离会议室 A。在本例中,该宽带连接 245 可以包括例如通过 IP 网络或 ISDN 线路的连

接。该会议连接 245 可以包括视频信道、音频信道、控制信道和蓝牙信道。

该视频会议单元 250 的各个层包括图 2 中所描述的无线层 252、硬件层 254、HCI 层 256、L2CAP 层 258、其它蓝牙栈部分 260 和应用层 262。还可以包括其它层，例如在蓝牙规范中所描述的，但是为了简洁起见未示出。

网络接口 264 通过信道 266 与 HCI 层 256 链接。根据本实施例，信道 266 可以包括用于发送和接收蓝牙数据的专有 RTP 信道。该网络接口 264 可以根据 H.323 标准操作，用于基于 IP 的网络，包括互联网的音频、视频和数据通信。该网络接口 264 还可以根据 H.320 标准操作，用于 ISDN 视频会议。该网络接口 264 还可以根据其它的标准和协议操作，不论是当前已知的还是今后开发的。

在会议室 B 中的视频会议单元 250 能够与该会议室 B 中的各种蓝牙使能设备建立射频 PAN。在本例中，在会议室 B 的 PAN 中的蓝牙使能设备包括个人电脑 270（例如手持 PC 或膝上型 PC 等）和 PDA 280。

一旦连接了会议，例如 H.323 或 H.320 视频会议，则 VCU 200 和 250 交换符合其各自性能的数据。例如，VCU 200 可以通知其能够发送和接收视频、音频和蓝牙数据，VCU 250 也可以通知其能够发送和接收视频、音频和蓝牙数据。

在交换性能之后，执行设备识别（也称为设备发现）的步骤。每个 VCU 200 和 250 都执行本地和远程的无线扫描，其收集结果并交换。因此，在图 2 所示的例子中，VCU 200 发现本地设备（打印机 220、PDA 230 和蜂窝电话 240）和远程设备（PC 270 和 PDA 280）；VCU 250 发现本地设备（PC 270 和 PDA 280）和远程设备（打印机 220、PDA 230 和蜂窝电话 240）。所有这种设备（打印机 220、PDA 230、蜂窝电话 240、PC 270 和 PDA 280）都像是位于同一个房间内，位于同一个无线网络中。每个设备都具有地址（例如，网络地址等）和一组属性（例如，支持什么样的蓝牙描述文件，例如耳机描述文件、数据交换描述文件等）。

在表示本发明原理的一个例子中，会议室 A 中的 PDA 230 和会议室 B 中的 PDA 280 能够执行 RS232 数据交换，从而通过连接 245 以电子商务卡的形式交换联系信息。尽管其各自的物理位置可能是几百或几千英里远，但是该数据交换表现为像在同一个物理微微网中。

可以按如下执行在蓝牙 PDA 之间交换联系信息的方法。首先，每个 PDA 搜寻相似的设备。接着，在所述 PDA 之间建立连接，例如在图 2 的 PDA 230 和 PDA 280 之间。所述包括电子商务卡数据（该数据可以例如以 vCard 或文本格式

存储)的数据依照设备描述文件被发射。可以基于在蓝牙 v1.1 描述文件所规定的对象推描述文件 (Object Push profile) 来执行类似数据的交换。最后, 关闭该连接。

在表示本发明的原理的另一个例子中, 与会者可以从他的或她的 PDA230、PDA280 或蜂窝电话 240 等直接拨打视频号码或电话号码。用户通常将地址簿和联系信息存储在其 PDA 和蜂窝电话中。使用户能够直接拨打这样的电话号码有利地使用户能够将其联系信息保持在中心资料库中。

可以按如下方法执行从无线设备, 例如蓝牙 PDA 直接拨打号码的方法。首先, 与会者拨打存储在它的或她的 PDA 中的通讯簿中的视频或音频号码, 该 PDA 例如是图 2 的 PDA 230。该视频会议单元 200 包括电话驱动器。该 PDA 230 连接至视频会议单元 200, 并通过蓝牙链路 216 向视频会议单元 200 发送该号码, 之后该视频会议单元 200 拨打该号码。

在表示本发明的原理的另一个例子中, 与会者可以对存储在其无线设备中的一组数据进行同步, 该数据例如是地址簿或日历。可以基于在蓝牙 1.1 描述文件中所规定的对象同步描述文件 (Object Synchronization) 来执行对例如地址簿或日历数据的同步。

在表示本发明的原理的另一例子中, 与会者可以参加到合作绘图中。例如, 近端用户可以在他的或她的 PDA 上绘图, 并将该绘图与远端共享。执行该绘图合作的应用可以在所使用的特定 PDA 的 SDK (软件开发工具包) 的顶层开发, 并基于 SDK 所使用的特定描述文件。

在表示本发明的原理的另一例子中, 可以将音频电话呼叫添加至视频会议中。该会议站, 例如 VCU 200, 包括内建的插入 (POTS-like) 音频端口, 用于蓝牙蜂窝电话, 例如蜂窝电话 240。该会议站作为蓝牙耳机, 而该蓝牙蜂窝电话充当音频网关。实现此特征的应用可以基于在蓝牙 v1.1 描述文件中所规定的手持机描述文件 (或免提电话描述文件)。

在表示本发明的原理的另一例子中, 与会者可以在白板上进行绘图, 以向其它的与会者表达他的或她的想法。不需要移动视频摄像机使其对准白板或使用有线白板, 该图像可以被无线发送至 VCU, 该 VCU 之后将该图像发送至远端, 并将该绘图在显示设备上显示。因此, 蓝牙白板可以加入到会议室 A 的 PAN 中, 且在该蓝牙白板上的绘图可以在位于远端的会议室 B 中的监视器上观看。实现



该特征的应用可以基于串行端口描述文件，并在特定白板供应商的 SDK 的顶层开发。

在表示本发明的原理的另一例子中，与会者可以使用蓝牙笔在纸张上绘画图表，该蓝牙笔例如是由 Anoto 所许可的。蓝牙笔可以捕捉图像，并通过蓝牙链路将其发送至视频会议单元。实现该特征的应用可以基于 Anoto 的 SDK。

在表示本发明的原理的另一例子中，通过使用蓝牙使能鼠标和键盘而提供了更加用户友好的方式，用于导航 UI（用户接口）项目或接收用户输入。实现该特征的应用可以基于在蓝牙 v1.1 描述文件中所规定的 HID（人机接口设备）。

在表示本发明的原理的另一例子中，音频数据可以被无线地从蓝牙使能麦克风发送至 VCU 基站。与传统的造成集成空间困难的麦克外壳（micpod）有线连接至基站相反，可以使用无线麦克外壳作为替代。实现该特征的应用可以基于专有的协议，以实现通过蓝牙链路 216 的最大数据吞吐量。

在表示本发明的原理的另一例子中，在 VCU 上运行的应用提供了在会议期间从远端打印文件，例如文档、幻灯片和商务卡等的能力。例如，存储在会议室 B 中的个人电脑 270 上的文档可以由位于远端的会议室 A 中的打印机 220 打印。实现该特征的应用可以根据特定的打印机而基于一个或多个以下提供蓝牙打印功能的描述文件：基本打印描述文件、硬拷贝电缆替代描述文件、基本图像描述文件、PAN 描述文件、对象推描述文件或串行端口描述文件等。

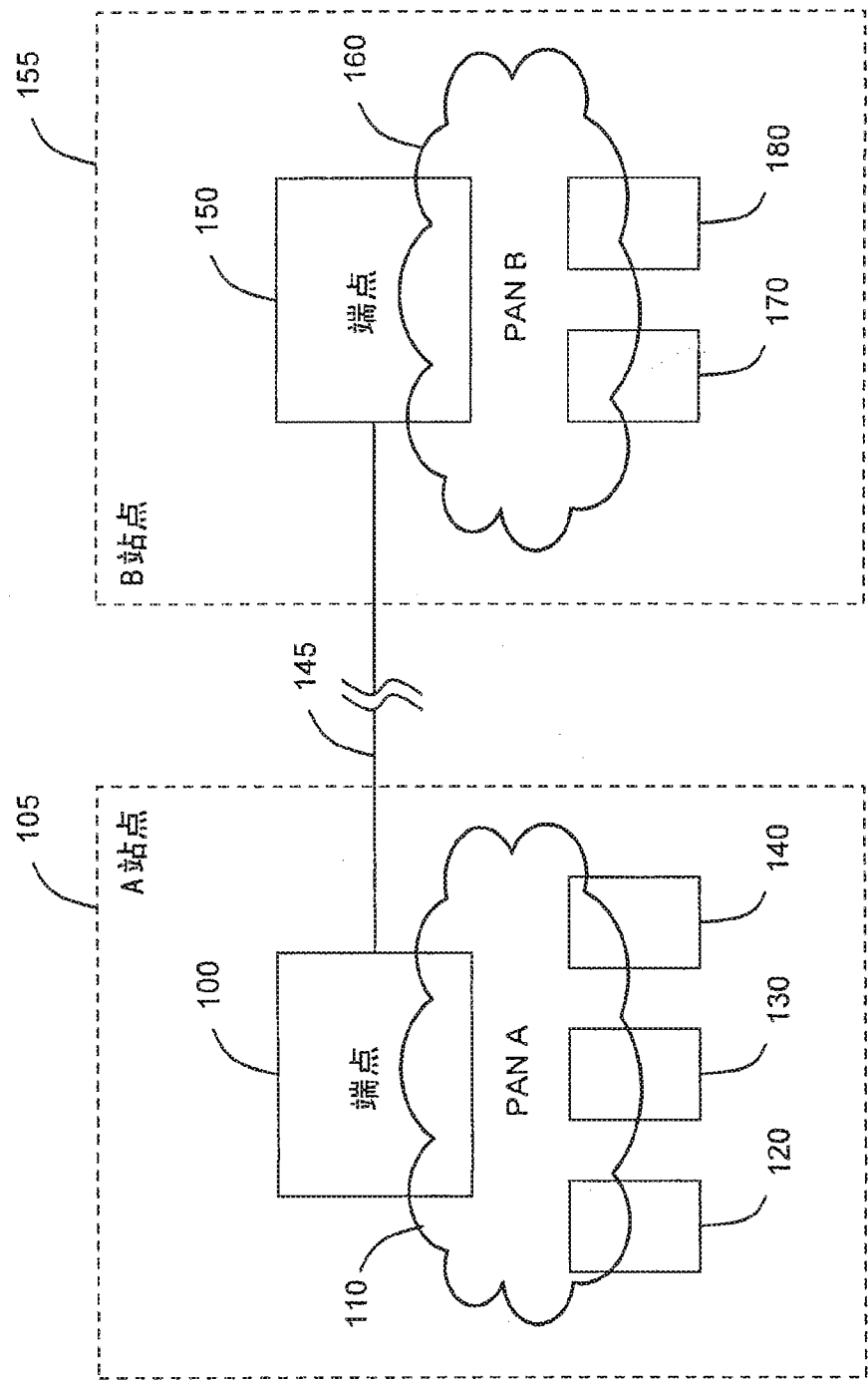
在表示本发明的原理的另一例子中，上述应用，例如同步、协作等，可以根据在你的 PC 中所具有的应用而进行组合。Windows® 和 Mac OS 提供了一些蓝牙支持。应用可以基于该 OS 支持和描述文件，或者与第三方应用使用。

图 3 描绘了根据本发明一个实施例的典型视频会议单元的方框图。该视频会议单元包括媒体处理器 310，该媒体处理器与接口 320 进行数据通信，该接口由现场可编程门阵列（FPGA）组成。蓝牙模块 330 与天线板 340 相连接用于 RF 通信，并与接口 320 连接用于数据通信。可以使用高速串行链路来连接该蓝牙模块 330 和接口 320。蓝牙模块 330 包括用于根据蓝牙规范进行通信的软件和代码。其中，蓝牙模块 330 可以包括用于执行上述任何应用的软件，以用于商务卡交换、直接拨号、数据同步、绘图协作、添加音频呼叫、蓝牙白板传输、蓝牙笔绘图、蓝牙用户输入、无线麦克风、无线打印和无线 PC 应用。在其它实施例中，可以根据不同的标准或协议执行通信，例如 UWB、802.11 或其它无线通信

规范。

图 3 所示的各个部分都可以作为视频会议单元的外围。例如，摄像机、监视器、麦克风、扬声器和超低音音响喇叭中的一个或多个都可以作为视频会议单元的外围。

尽管本发明已经结合有限个实施例进行描述，但是本领域技术人员将了解其大量的修改和变化。应注意，所附的权利要求覆盖了在本发明的实质精神和范围之内的所有修改和变化。



200710126667.6

说明书附图 第2/3页

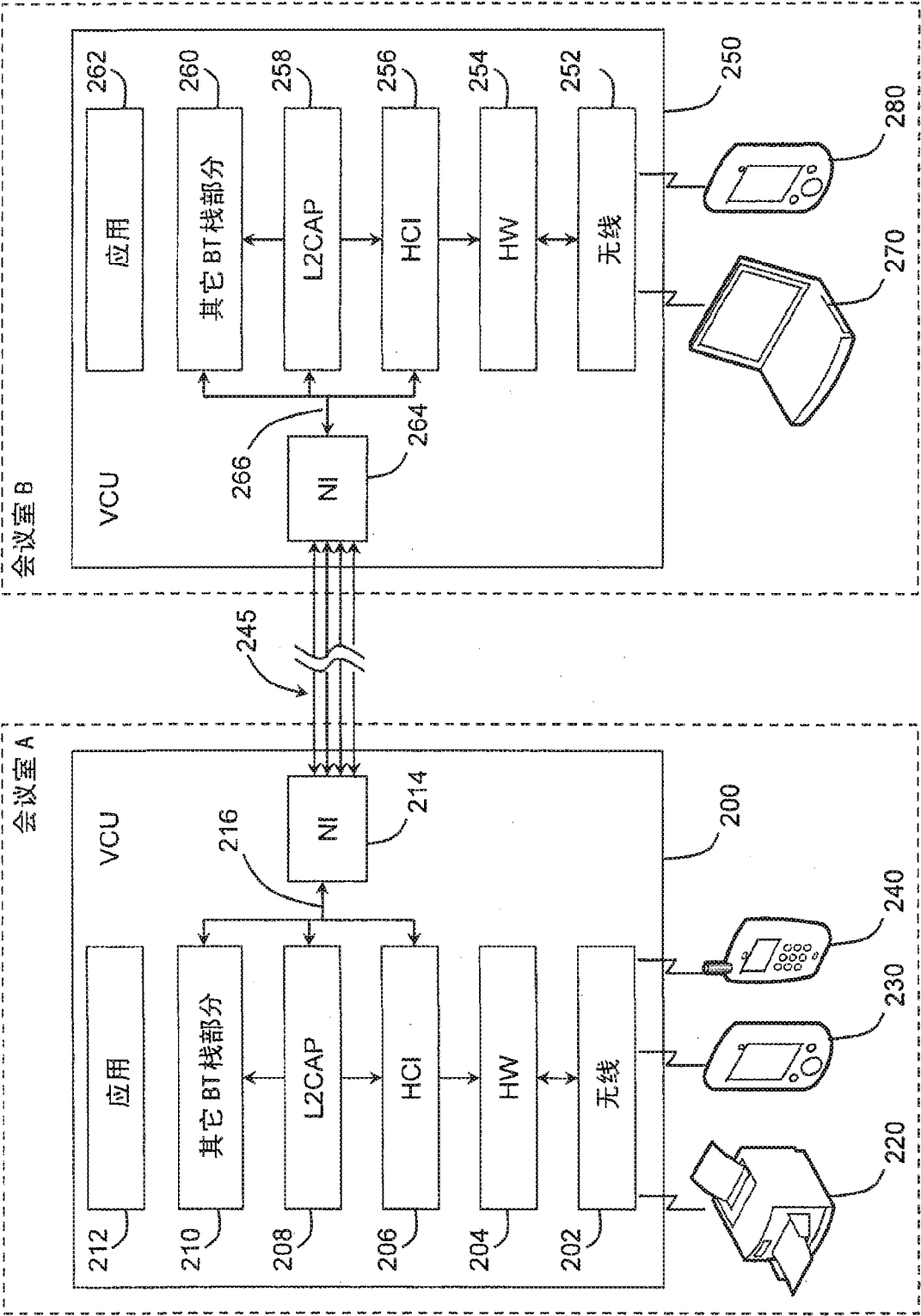


图 2



200710126667.6

说明书附图 第3/3页

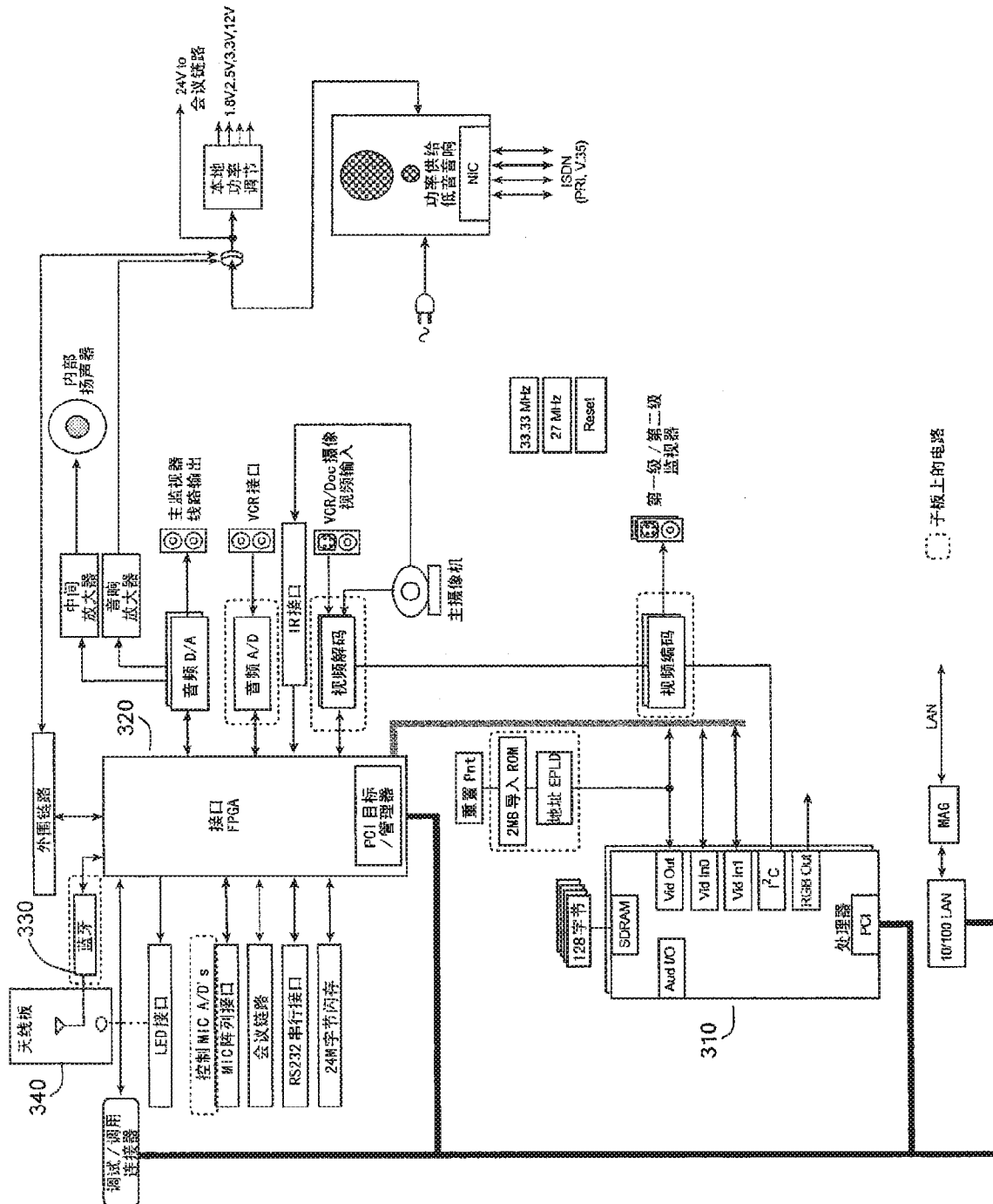
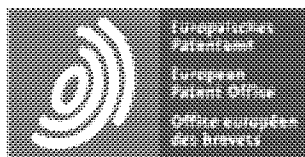


图 3



# Espacenet

CN102025774A Device for realizing interactive communication of white board television information among multiple users by wireless transmission

Applicants: TPV DISPLAY TECHNOLOGY XIAMEN

Inventors: FAN ZENG,HAOZHENG LIN

Classifications:

IPC

**H04L29/08; H04N7/15;**

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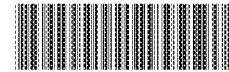
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Device for realizing interactive communication of white board television information among multiple users by wireless transmission

## Abstract

The invention discloses a method for realizing interactive communication of white board television information among multiple users by wireless transmission. A device for implementing the method comprises a white board television server, handwrite control display terminals, wireless communication modules, a data storage module and a remote controller, and is characterized in that: a plurality of handwrite control display terminals and the white board television server are provided with the wireless communication modules; the white board television server is started by a user to start a white board television function; the handwrite control display terminals request to be connected with the television server through a wireless display (Wi-Di) communication mode; the server is controlled by the remote controller to receive a connection request; after the connection is established, one of the handwrite control display terminals transmits a server control right request to the television server; and the server receives the request through the remote controller and a shared data region is opened. The handwrite control display terminals transmit the information to be written to the white board television server through the Wi-Di communication mode and newly uploaded information is stored in the data storage module of the television server by using the remote controller so as to finish data updating. Multi-user interactive communication can be realized in a television conference through the equipment; and users can simultaneously share the information resource, update the information on the server and immediately store and issue the information.

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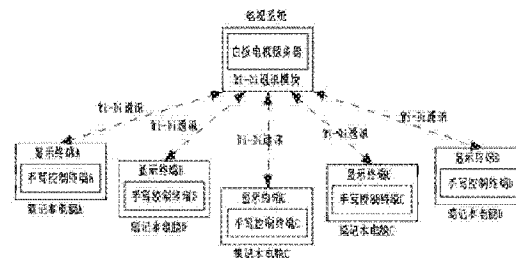
权利要求书 1 页 说明书 2 页 附图 3 页

### (54) 发明名称

无线传输实现多用户对白板电视信息的交互沟通的装置

### (57) 摘要

一种无线传输实现多用户对白板电视信息的交互沟通的方法,包括:白板电视服务器,手写控制显示终端,无线通信模块,数据存储模块,遥控器,其特征在于:多台手写控制显示终端与白板电视服务器上均装有无线通信模块,用户启动白板电视服务器,开启白板电视功能,手写控制显示终端与电视服务器通过 Wi-Fi 通信方式请求建立连接,通过遥控器控制服务器接受连接请求,连接建立后,其中一台手写控制显示终端向电视服务器发送服务器控制权的请求,通过遥控器使服务器接受请求并开启共享数据区。手写控制显示终端将要书写的信息通过 Wi-Fi 通信方式上传给白板电视服务器,并用遥控器将新上传信息存至设置在电视服务器的数据存储模块,完成数据更新。通过该设备在电视会议时可实现多用户交互沟通,用户可以同时共享信息资源,也可以对服务器上的信息进行更新,并可及时保存发布。



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1. 一种无线传输实现多用户对白板电视信息的交互沟通的方法，包括：白板电视服务器，手写控制显示终端，无线通信模块，数据存储模块，遥控器，其特征在于：多台手写控制显示终端与白板电视服务器上均装有无线通信模块，用户启动白板电视服务器，开启白板电视功能，手写控制显示终端与电视服务器通过 Wi-Di 通信方式请求建立连接，通过遥控器控制服务器接受连接请求，连接建立后，其中一台手写控制显示终端向电视服务器发送服务器控制权的请求，通过遥控器使服务器接受请求并开启共享数据区。手写控制显示终端将要书写的信息通过 Wi-Di 通信方式上传给白板电视服务器，并用遥控器将新上传信息存至设置在电视服务器的数据存储模块，完成数据更新。

2. 根据权利要求 1 所述的无线传输实现多用户对白板电视信息的交互沟通的方法，其特征在于：该台手写控制显示终端向电视服务器发送释放对白板电视服务器的控制权的请求后，其他的白板电视可继续申请对服务器端的控制权，得到控制权后，其他用户可以将白板电视上的数据通过 Wi-Di 通信方式同步到自己手写控制单元的软件上显示出来，也可以对原来保存在电视服务器数据存储模块上的信息通过手写控制显示终端继续进行修改并传输到白板电视上供其他用户观看。

3. 根据权利要求 1 所述的无线传输实现多用户对白板电视信息的交互沟通的方法，其特征在于：用户交互沟通过程最终完成后，可以通过白板电视的网络功能或最终连接服务器的手写控制显示终端使用网络对先前所交流沟通的信息进行保存和发布。

4. 根据权利要求 1 所述的无线传输实现多用户对白板电视信息的交互沟通的方法，其特征在于：电视服务器端内嵌有操作系统，无线通信模块，数据存储模块；手写控制显示终端装有显示器，无线通信模块，手写控制模块。

5. 根据权利要求 1 所述的无线传输实现多用户对白板电视信息的交互沟通的方法，其特征在于：手写控制终端上传信息后，服务器将信息进行保存，同时该信息也已保存在手写控制终端。

6. 根据权利要求 1 所述的无线传输实现多用户对白板电视信息的交互沟通的方法，其特征在于：白板电视服务器内嵌有白板电视服务器软件，操作系统，手写控制显示单元装有白板电视终端软件。

7. 根据权利要求 1 所述的无线传输实现多用户对白板电视信息的交互沟通的方法，其特征在于：手写控制显示终端可通过具有 Wi-Di 通信模块功能的笔记本电脑实现。

## 无线传输实现多用户对白板电视信息的交互沟通的装置

### 技术领域

[0001] 本发明涉及一种无线传输实现多用户对白板电视信息的交互沟通的方法，通过该设备在电视会议时可实现多用户交互沟通。

### 背景技术

[0002] 目前在电子白板领域，主要是单用户实现信息的输入或者通过远程获取白板信息。在进行多人电视会议时，只能由其中一个人进行信息的输入修改，其他参会人员则通过显示终端观看会议内容，要进行多人的信息交流沟通，通常都是借助于语音设备，再由人工将语音信息转化为文本信息，导致沟通的不及时、不顺畅，甚至出现信息的遗漏，造成不必要的麻烦。

### 发明内容

[0003] 本发明目的是要提供一种无线传输实现多用户对白板电视信息的交互沟通的方法，该方法能通过无线传输实现多用户对白板电视信息的交互沟通使用户可以同时共享信息资源，也可以对服务器上的信息进行更新。

[0004] 本发明的无线传输实现多用户对白板电视信息的交互沟通的装置，包括：白板电视服务器，手写控制显示终端，无线通信模块，数据存储模块，遥控器，其特征在于：多台手写控制显示终端与白板电视服务器上均装有无线通信模块，用户启动白板电视服务器，开启白板电视功能，手写控制显示终端与电视服务器通过 Wi-Di 通信方式请求建立连接，通过遥控器控制服务器接受连接请求，连接建立后，其中一台手写控制显示终端向电视服务器发送服务器控制权的请求，通过遥控器使服务器接受请求并开启共享数据区。手写控制显示终端将要书写的信息通过 Wi-Di 通信方式上传给白板电视服务器，并用遥控器将新上传信息存至设置在电视服务器的数据存储模块，完成数据更新。本装置控制思路清晰，易操作，可广泛应用于电视、显示器等显示产品领域，实现的多用户输入、显示的交互应用。

### 附图说明

[0005] 图 1 是本发明系统硬件与模块框图。

[0006] 图 2 是本发明软件流程。

[0007] 图 3 是本发明的具体实施例系统连接图。

### 具体实施方式

[0008] 如图 1 所示，将笔记本电脑作为手写控制显示终端进行交流，硬件方面笔记本电脑内嵌有 Wi-Di (Wireless Display) 无线功能模块，电视系统端装有 Wi-Di (Wireless Display) 无线功能模块，数据存储模块，服务器模块。软件方面笔记本端装有白板电视终端软件，电视系统装有白板电视服务器软件及操作系统 (OS)。笔记本电脑与电视系

统间通过 Wi-Fi 方式进行通信，实现从 PC 机向其他高清电视机以无线方式传输图像和视频。

[0009] 如图 2 所示，服务器端的软件工作流程：用户开启服务器白板电视功能，系统进行初始化，初始化完毕，服务器判断是否有终端设备连接服务器请求，有则接受并建立连接，无就返回继续判断。连接建立完毕，判断是否有终端对服务器控制权的请求，有则接受请求开启共享数据区，接收手写终端的输入，并将信息进行修改、存储，等待传送到其他终端进行显示。完成信息处理后，继续判断终端是否释放对服务器的控制权，不释放，则按照上述信息交流方式及时更新信息，若终端释放控制权，服务器则返回至判断是否有控制权请求的环节进行工作。

[0010] 手写控制显示终端的软件工作流程：开启白板电视终端软件，进行参数配置及屏幕初始化，初始化完毕，手写控制终端发送服务器连接请求，判断服务器有无请求应答，有则进入下一步骤，无则范围继续发送连接请求，服务器应答后，控制终端进行参数配置，建立连接，接着向服务器发送控制权请求，判断服务器是否有返回的释放控制权的应答，有则获取服务器控制权并开辟数据通信缓冲区，输入信息上传至服务器端并存储在控制终端，再从服务端接受信息显示，若无释放控制权应答，则继续发送控制权请求，数据发送完毕，释放控制权。

[0011] 以上所述仅为本发明的较佳实施例，凡依本发明申请专利范围所做的均等变化与修饰，皆应属本发明的涵盖范围。

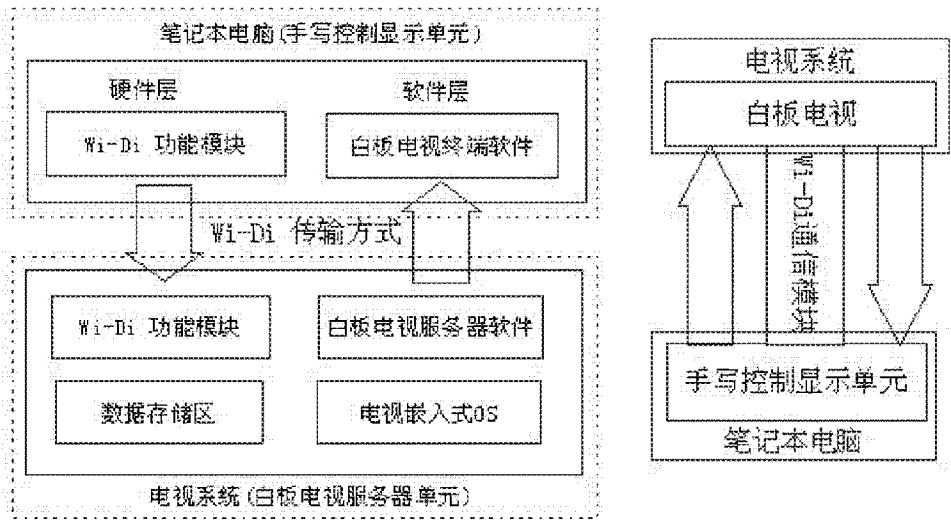


图 1



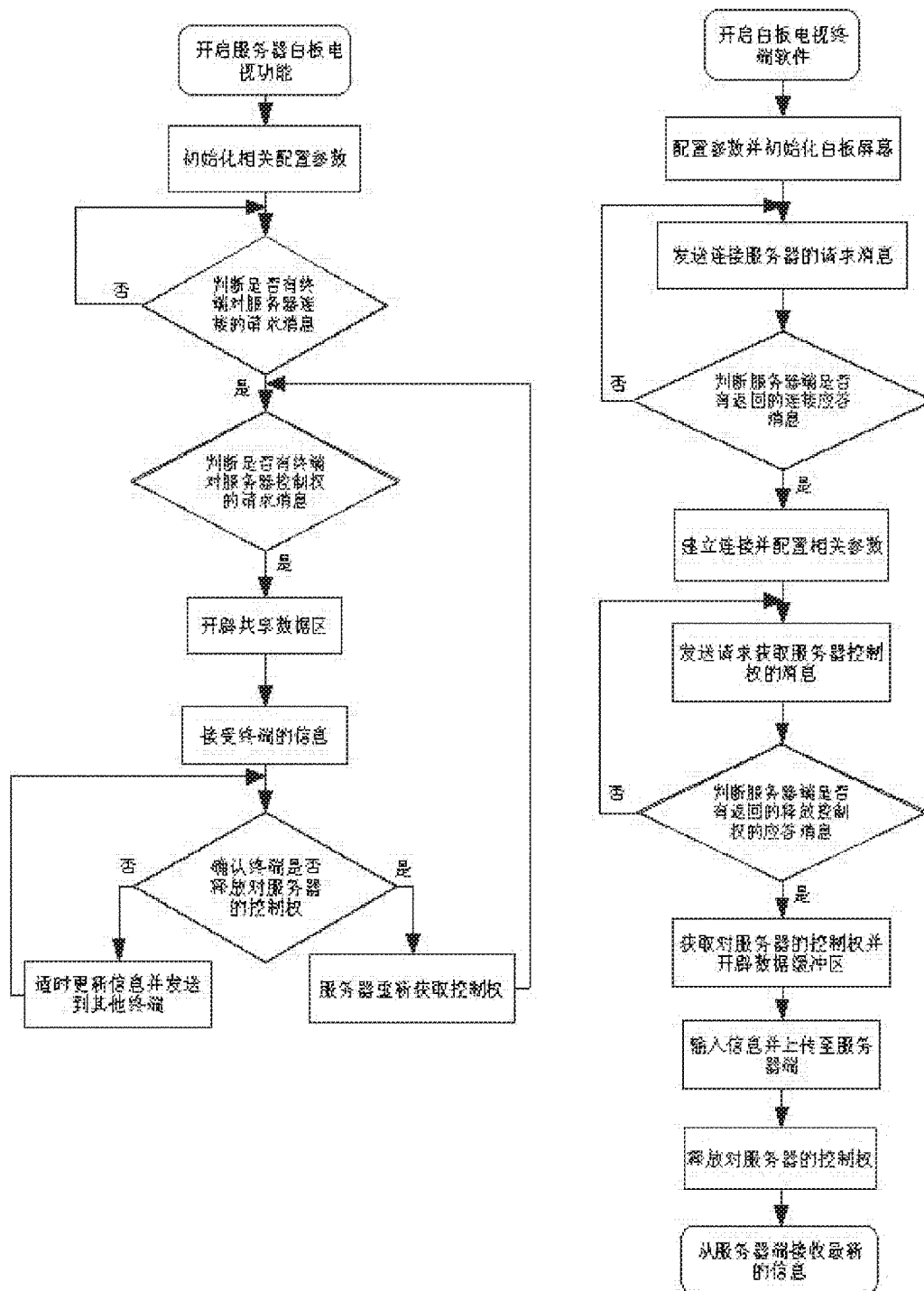


图 2



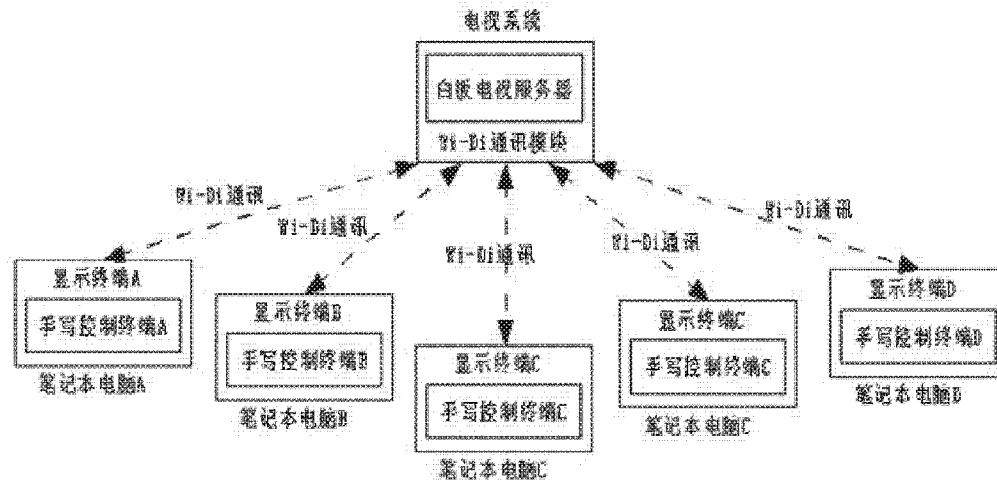
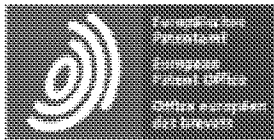


图 3



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## DESCRIPTION CN102088593A

<sup>10</sup> The invention discloses a MPEG4 compressed video transmission communication system based on Bluetooth 3.0 specification, which mainly solves the problems of low communication fluency and single function mode of the existing video transmission system. The communication system includes a Bluetooth control module, a video acquisition module, an audio acquisition and playback module, an ARM-side processing control module, a DSP-side video codec module, an interface operation module, and an external storage module; the ARM-side processing control module receives the audio acquisition and playback module and The audio and video data collected by the video acquisition module, the DSP end video codec module encodes and decodes the data sent by the ARM end processing control module and stores the encoded video data in the external storage module, and sends the data to be transmitted through the Bluetooth control module Or receive, display video data and user graphical interface through the interface operation module. The invention has multiple functional modes, adapts to a variety of different environments, and can be used for medium and short distance self-organizing network video and voice transmission.

<sup>22</sup> MPEG4 compressed video transmission communication system and method based on Bluetooth 3.0 specification

<sup>24</sup> Technical field

<sup>25</sup> The invention belongs to the field of wireless communication technology, and relates to video compression technology and real-time video and voice transmission, in particular to a video transmission communication system using Bluetooth 3.0 wireless transmission technology, which can be used for medium and short distance self-organized network video and voice transmission.

<sup>29</sup> Background technique

<sup>30</sup> 2009 On April 21, 2005, the Bluetooth Technology Alliance officially promulgated version 3.0 of the Bluetooth Core Specification as a new generation of Bluetooth technology standard specifications. The core of Bluetooth 3.0 is a new alternate radio frequency technology AMP, which allows the Bluetooth protocol stack to dynamically select the correct radio frequency for any task. Bluetooth 3.0 has the advantage of high transmission speed. By integrating the "802.11PAL" protocol adaptation layer, Bluetooth 3.0 can call 802.11Wi-Fi to achieve high-speed data transmission when needed, and its data transmission rate can be increased to 24Mbps, which is Bluetooth 2.0 Eight times.

<sup>37</sup> In recent years, wireless information communication has become an indispensable part of people's lives, and

video and voice communication, as the main information carriers, have been used more and more widely. The existing wireless video transmission system generally uses Bluetooth 2.0 or Wi-Fi technology as the main communication network. Both methods have their own shortcomings: the traditional Bluetooth 2.0 has a small communication range and a low rate; while Wi-Fi The safety of the technology is poor, and the safety design is relatively complicated in use. At the same time, the video compression technology adopted by the existing video transmission system has a single compression mode, low compression rate and poor video quality. This makes the existing video communication system have the following shortcomings: (1) Large transmission range and transmission rate cannot have both high security; (2) Poor compatibility; (3) Poor video quality ; (4) The video communication mode is single, and it is difficult to adapt to environments with different requirements for video quality.

48 Summary of the invention

49 The purpose of the present invention is to avoid the above-mentioned shortcomings in the prior art, and to provide a MPEG4 compressed video transmission communication system based on Bluetooth 3.0 specifications to quickly build a wireless and secure communication network in a variety of environments, especially harsh environments, Carry out fast real-time video and voice transmission, and adjust the image quality at any time as needed to transmit multiple forms of video modes to meet the needs of multiple communication forms for different image quality.

55 In order to achieve the above objective, the communication system of the present invention includes:

56 The Bluetooth control module is used to establish a wireless communication channel, which includes a control channel, a video channel, and an audio channel. The control channel is used to send or receive control commands in the Bluetooth 3.0 ad hoc network; the video channel is used in the Bluetooth 3.0 ad hoc network Send or receive encoded video data in the internal; audio channel is used to send or receive audio data in the Bluetooth 3.0 ad hoc network, and transmit the received commands and data to the ARM end processing control module;

62 The video acquisition module is used to collect on-site video information, convert the analog information of the video image into digital video data, and transmit the converted video data to the ARM end processing control module;

65 Audio collection and playback module, used to collect real-time audio data and play the received audio data, and transmit the collected real-time audio data to the ARM end processing control module;

67 Interface operation module, used to display video images and user graphical interface, use mouse or touch control to generate control commands, and transmit the control commands to the ARM end processing control module, the user graphical interface display content includes video display area, switch function mode button Area, switch video quality button area, call device selection area and current status display area;

71 The DSP end video codec module is used to perform MPEG4 codec on video data, and send the coded and decoded video data to the ARM end processing control module;

73 The ARM processing control module is used to receive and process control commands from the interface operation module and Bluetooth control module, video data from the video acquisition module, audio data from the audio acquisition and playback module, and video data and audio from the Bluetooth control module Data and video data from the DSP video codec module;

77 The external storage module contains a file system with a log structure for storing the control program, operating system, control command and encoded video data of the system.

79 The control method of the MPEG4 compressed video transmission communication system based on the

Bluetooth 3.0 specification of the present invention includes an initiator control method and a receiver control method, wherein:

82 A. The initiator control method includes the following steps:

83 A1) Display user graphical interface;

84 A2) Select the device that needs to communicate, and send a connection request to the selected device;

85 A3) Determine whether to establish a communication channel between the master and slave devices according to whether the selected device accepts the connection request, if yes, the communication connection is established, otherwise, reselect the device that needs to communicate and send the connection request;

88 A4) Select the function mode, send the selected mode information to the connected slave device, and determine the channel according to the selected function mode:

90 In the remote recording and wireless monitoring mode, open the video channel and perform step A9);

91 In the intercom mode, open the audio channel and perform step A5);

92 In the video call mode, open the video channel and audio channel at the same time, and perform step A5) and step A9) in parallel;

94 A5) Start collecting audio data;

95 A6) Send the collected audio data to the slave device;

96 A7) Receive audio data packets sent from the device;

97 A8) Play the audio data in the received audio data packet, jump to step A13), and perform steps A5) ~ A8) in a loop until the user switches the function mode or the session ends;

99 A9) Receive the encoded video data packet sent from the device, extract the video data in the data packet, and decide whether to store the video data according to the user's choice, if so, store the video data to the external storage module, otherwise not store it;

102 A10) Decoding the video data extracted from the data packet;

103 A11) Display the decoded video data in the video display area of the interface operation module, enter step A12), and perform steps A9) ~ A11) in a loop until the user switches the function mode or the session ends;

106 A12) Determine whether to adjust the video quality mode according to the user's selection, if yes, send the new mode information to the slave device, and return to step A9), otherwise go to step A13);

108 A13) Determine whether to adjust the function mode according to the user's choice, if yes, return to step A4), otherwise go to step A14);

110 A14) Decide whether to end the session according to the user's choice, if yes, send an end command to the slave device, the session ends, otherwise continue the session.

112 B. The receiving end control method includes the following steps:

113 B1) Display user graphical interface;

114 B2) Decide whether to respond to the connection request from the master device according to the user's choice, if it responds, establish the communication channel of the master and slave device, and proceed to step B3), otherwise continue to wait for a new connection request;

117 B3) Receive the mode information from the master device, and determine the communication steps according to the mode information:

119 For remote recording and wireless monitoring mode, perform step B8);

120 For intercom mode, perform step B4);

121 For the video call mode, step B4) and step B8) are executed in parallel;

122 B4) Start collecting audio data;  
123 B5) Send the collected audio data;  
124 B6) Receive audio data packets sent via Bluetooth;  
125 B7) Play the received audio data, skip to step B3), and perform steps B4) ~ B7) in a loop until new function mode information is received or the session ends;  
127 B8) Collect raw video data;  
128 B9) Display the original video data in the video display area of the interface operation module;  
129 B10) Perform MPEG4 encoding on the original video data;  
130 B11) Send the encoded video data to the main device, enter step B12), and perform steps B8) ~ B11) in a loop until new function mode information is received or the session ends;  
132 B12) Determine whether to adjust the video quality mode according to whether the new video quality information is received, if so, determine the MPEG4 encoding parameters according to the new video quality information, and return to step B8), otherwise go to step B13);  
135 B13) Determine whether to adjust the function mode according to whether the new function mode information is received, if yes, go back to step B3), otherwise go to step B14);  
137 B14) Determine whether to end the session according to whether an end command is received, if yes, the session ends, otherwise continue the session.  
139 The present invention has the following advantages:

1.

143 The Bluetooth 3.0 self-organizing network is adopted in the present invention, which has larger network coverage, faster transmission rate and higher security.

2.

148 The invention adopts MPEG4 video coding and decoding technology, which has higher definition under the same compression rate, and saves storage space. When there are errors or packet loss in network transmission, MPEG4 is less affected and can be quickly restore.

3.

154 The present invention designs 4 function modes and 3 video quality modes, optimizes the fluency and image quality of video display in different environments, and satisfies various complex environments.

4.

159 The present invention uses the status prompt window of the user graphic interface to display the information status of the current mode, including the current function mode status, current video quality status, communication slave device number, current video and audio transmission rate and codec frame rate, which can clearly indicate the system The connection between the user and other terminals in the wireless network enables users of the system to intuitively understand the entire wireless network environment, which is

beneficial for users to make reasonable functional choices according to their needs.

5.

168 The invention not only realizes the video conversation in the wireless network, but also can selectively save the video data, which is convenient for repeated viewing.

6.

173 Because the external storage module of the present invention includes a file system with a log structure, it ensures that data will not be lost when the power is accidentally lost.

175 Description of the drawings

176 Figure 1 is a diagram of the connection mode provided by the existing Bluetooth system;

177 Figure 2 is a schematic diagram of the system structure of the present invention;

178 Fig. 3 is a schematic diagram of the layout of the user graphical interface of the present invention;

179 Figure 4 is a block diagram of the MPEG4 video encoder used in the present invention;

180 Fig. 5 is a control flow chart of the video transmission communication by the session initiating terminal of the present invention;

182 Fig. 6 is a control flow chart of the video transmission communication by the session receiving end of the present invention.

184 detailed description

185 The present invention utilizes the connection mode provided by the existing Bluetooth 3.0 system, as shown in Fig. 1, to realize a fast and safe self-organizing local area network.

187 Figure 1a is a point-to-point connection; Figure 1b is a microgrid composed of a point-to-multipoint connection, where one unit serves as the microgrid master unit and the other is a microgrid slave unit; Figure 1c is a microgrid composed of multiple overlapping microgrids A scattered net.

190 Referring to Figure 2, the double arrow in the figure is the data line, and the single arrow is the control line.

The communication system of the present invention mainly consists of a video acquisition module 101, a DSP end video codec module 102, an audio acquisition and playback module 103, and an ARM end processing control module 104, an external storage module 105, an interface operation module 106, a Bluetooth control module 107 and a Bluetooth antenna 108 are composed.

195 among them:

196 The video capture module 101 can use a common camera or a digital camera. This example uses but is not limited to a common CCD camera and a hardware A/D converter. The hardware A/D conversion device uses TI' s video decoder chip TVP5146 to complete the simulation Video data to digital video data conversion, the chip allows 10 channels of analog video input, with 4 channels of 10bit A/D converter, field synchronization signal, line synchronization signal, odd and even field signal, clock output signal are directly led out by the pin, saving The design of the synchronous clock circuit is gone.

202 The DSP-side video codec module 102 and the ARM-side processing control module 104 are implemented using but not limited to TI' s embedded ARM and DSP dual-core structure embedded development platform, which is similar to other structural solutions that use a single processor to implement application functions. Compared with, this kind of scheme has an obvious advantage, namely can improve the power



and efficiency, and extend the user's battery life.

207 This is because the DSP chip is specially designed and customized for processing real-time video signals. The use of two processors can reasonably divide the total workload, thereby reducing clock operating frequency, reducing power consumption, and further reducing system costs.

210 The audio collection and playback module 103 is composed of a common headset.

211 The external storage module 105 adopts any kind of flash chip. In this example, a 64M flash chip is used and the linux operating system is adopted. In order for the flash chip to have the storage function, a linux root file system must be established. The root file system Cramfs, JFFS2, RAM disk and Ext2 can be used.

214 The example of the present invention adopts the JFFS2 root file system.

215 The interface operation module 106 adopts any ordinary resistive or capacitive display screen, and only needs a corresponding driver. In this example, a 4-wire resistive touch screen is adopted, and a 3.5-inch TFT true color LCD screen is adopted.

218 3, the user graphic interface of the interface operation module 106 of this example is divided into a video display area 109, a switch function mode button area 110, a switch video quality button area 111, a call device selection area 112, and a current status display area 113. In this example, The user can browse the stored video files, choose to open, and select the file to be played. The video content will be displayed in the video display area 109 in the middle of the interface.

223 The Bluetooth control module 107 adopts any adapter that conforms to the Bluetooth 3.0 specification. In this example, a Bluetooth 3.0 USB adapter is used.

225 The Bluetooth antenna 108 uses an external SMA antenna.

226 The connection relationship of the above modules is as follows:

227 The video acquisition module 101 is connected to the ARM end processing control module 104, the ARM end processing control module 104 receives the original video data collected by the video acquisition module 101; the DSP end video codec module 102 is connected to the ARM end processing control module 104, and the DSP end video encoding The decoding module 102 encodes and decodes the video data transmitted from the ARM end processing control module 104, and sends the encoded and decoded video data back to the ARM end processing control module 104; the audio capture and playback module 103 is connected to the ARM end processing control module 104, The ARM processing control module 104 receives the audio data collected by the audio acquisition and playback module 103, and transmits the audio data to be played to the audio acquisition and playback module 103 for playback; the external storage module 105 is connected to the ARM processing control module 104, and the ARM processing controls The module 104 runs the control program and operating system of the system stored in the external storage module 105. The external storage module 105 stores the video data that the ARM processing control module 104 needs to save; the interface operation module 106 is connected to the ARM processing control module 104, and the interface The operation module 106 displays the user graphic interface and the video data that needs to be displayed received by the ARM end processing control module 104, the ARM end processing control module 104 processes the control commands generated by the interface operation module 106; the Bluetooth control module 107 and the ARM end processing control module 104 Connected, the ARM processing control module 104 sends the received audio data and encoded video data to the Bluetooth control module 107, while the Bluetooth control module 107 receives the encoded video data to the ARM processing control module 104 for processing; Bluetooth antenna 108 Connect with the Bluetooth control module 107.

247 The above-mentioned modules can be integrated on a PCB circuit board, and the interface operation module

106 is placed on other modules to achieve the miniaturization of the present invention.

249 Referring to Figure 5, the initiating end control method of the MPEG4 compressed video transmission communication based on the Bluetooth 3.0 specification of the present invention includes the following steps:

252 Step 1. Display the user graphic interface. The user graphic interface is divided into video display area, function mode button area, video quality button area, call device selection area, and current status display area. The user can browse the stored video files and choose to open. Just select the file you want to play, and the video content will be displayed in the video display area in the middle of the interface.

256 Step 2. The user selects the device that needs to communicate on the graphical interface, clicks the initiate connection button, and sends a connection request to the selected device.

258 Step 3: Wait for the selected device to respond, and determine whether to establish a communication channel between the master and slave devices according to whether the device accepts the connection request.

260 After the communication device receives the connection request sent by the system, its user graphical interface will prompt a message dialog box. The content of the message dialog box includes: the name of the device requesting the connection, the accept button and the reject button. The user clicks the accept button to accept the connection, The communication connection is established, otherwise click the reject button, after the user selects, the selected information will be fed back to the connection requester.

265 The system receives the feedback information of the communication device, and if the connection is accepted, the communication channel between the master and the slave device is established. The connection initiator is the communication master device and the connection acceptor is the communication slave device. If the connection is rejected, a new communication device is selected and the connection is initiated again.

269 Step 4. After the communication connection is established, the user clicks the button in the function mode area to select the function mode.

271 The functional modes of the present invention include: remote recording, wireless monitoring, intercom mode, and video call. In the remote recording mode, the system stores the video data sent from the device by default. In other modes, the user chooses whether to save the sent Video data, after selection, the system sends the selected mode information to the connected slave device, and determines the steps according to the selected function mode:

276 4a) In the remote recording and wireless monitoring mode, open the video channel and go to step 9;

277 4b) In the intercom mode, open the audio channel and perform step 5;

278 4c) In the video call mode, open the video channel and audio channel at the same time, and perform step 5 and step 9 in parallel.

280 Step 5. Collect live audio data through the microphone.

281 Step 6. Pack the collected audio data and send it to the slave device through the Bluetooth control module.

282 Step 7, receiving the audio data packet sent from the device, and extracting the audio data in the audio data packet.

284 Step 8. Play the extracted audio data through the earphone, skip to step 13, and execute steps 5 to 8 in a loop until the user switches the function mode or the session ends.

286 Step 9. Receive the MPEG4-encoded video data packet sent from the device through the Bluetooth control module, extract the video data in the data packet, and decide whether to store the video data according to the user's choice, and if so, store the video data to the external storage Module, otherwise it will not be stored;

289 Step 10: Perform MPEG4 decoding on the video data extracted from the data packet.



- 290 Step 11: Display the decoded video data in the video display area of the interface operation module, proceed to step 12, and execute steps 9-11 in a loop until the user switches the function mode or the session ends.
- 292 Step 12. The user clicks the button in the video quality button area to adjust the video quality mode.
- 293 According to the wireless network environment, the video quality mode in the user graphic interface of the present invention respectively names three modes: high-definition MJPEG image, real-time clear video, and real-time ordinary video. Each video mode encapsulates different video parameters to adapt to different network environments. When transmitting high-definition MJPEG images, the frame rate is 3fp/s and the image resolution is 1024x768. The image lacks real-time performance, but the image is clear, which can meet the needs of users for scene details in the case of poor network communication; real-time clear video, frame rate is 25fp/s, the image resolution is 720x480, and clearer video sessions can be carried out smoothly when the network is running well; real-time ordinary video, the frame rate is 25fp/s, and the image resolution is 352x288, which can run more on the network. Poor guarantees that the video session can proceed smoothly.
- 303 If the user selects one of the three video quality modes, and it is different from the current video quality mode, then send the selected mode information to the slave device and return to step 9; otherwise, go to step 13.
- 305 Step 13. During the communication process, the user switches the function mode at any time as needed. If the user selects a mode different from the existing function mode, return to step 4, otherwise, go to step 14.
- 307 Step 14. The user clicks the disconnect button on the interface operation module to end the session. If the user ends the session, an end command is sent to the slave device, and the session ends, otherwise the session continues.
- 310 Referring to Fig. 6, the receiving end control method of MPEG4 compressed video transmission communication based on Bluetooth 3.0 specification of the present invention includes the following steps:
- 312 Step A: Display the user graphic interface. The user graphic interface is divided into video display area, function mode button area, video quality button area, call device selection area and current status display area. The user can browse the stored video files and choose to open. Just select the file you want to play, and the video content will be displayed in the video display area in the middle of the interface.
- 316 Step B: Waiting for the connection request of other devices. After the system receives the connection request sent by other devices, its user graphical interface will prompt a message dialog box. The content of the message dialog box includes: the name of the device requesting connection, an accept button, and Reject button, the user accepts the connection and clicks the accept button to establish a communication channel between the master and slave devices. The connection initiator is the communication master device and the connection recipient is the communication slave device. If the user rejects the connection, click the reject button. After the user chooses, The selected information will be fed back to the connection requester.
- 323 If the communication connection is established, go to step C, otherwise continue to wait for a new connection request.
- 325 Step C: Receive mode information from the main device, the mode information includes: function mode and video quality mode, where:
- 327 Function modes include: remote recording, wireless monitoring, intercom mode and video call;
- 328 Video quality modes include: high-definition MJPEG image, real-time clear video, real-time ordinary video 3 modes. Each video mode encapsulates different video coding parameters to adapt to different network environments. When transmitting high-definition MJPEG images, the frame rate is 3fp/s and the image resolution is 1024x768. The image lacks real-time performance, but the image is clear, which can meet the

needs of users for scene details in the case of poor network communication; real-time clear video, frame The rate is 25fp/s, the image resolution is 720x480, and clearer video sessions can be carried out smoothly when the network is running well; real-time ordinary video, the frame rate is 25fp/s, and the image resolution is 352x288, which can run more on the network Poor guarantees that the video session can proceed smoothly.

336 Determine the communication steps according to the received mode information:

337 C1) For remote recording and wireless monitoring mode, perform step H;

338 C2) For the intercom mode, perform step D;

339 C3) For the video call mode, step D and step H are performed in parallel.

340 Step D: Collect live audio data through a microphone.

341 Step E: Pack the collected audio data and send it to the slave device through the Bluetooth control module.

342 Step F: Receive the audio data packet sent from the device, and extract the audio data in the audio data packet.

344 Step G: Play the received audio data through the earphone, jump to step M, and execute steps D to G in a loop until new function mode information is received or the session ends.

346 Step H: Collect original live video frequency information from an ordinary CCD camera, and convert it into digital original video data through a hardware A/D converter.

348 Step I: Display the original video data in the video display area of the interface operation module.

349 Step J: Perform MPEG4 encoding on the original video data.

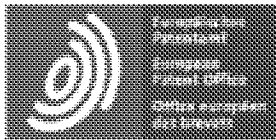
350 The present invention uses MPEG4 as the video coding and decoding algorithm, and MPEG4 is superior to other compression/decompression schemes in three aspects. First of all, since it was developed as an international standard at the beginning, it has good compatibility; secondly, MPEG4 can provide a better compression ratio than other algorithms, up to 200:1, and more importantly Yes, while MPEG4 provides a high compression ratio, the loss of data is small.

355 Figure 4 shows the specific implementation block diagram of the MPEG4 video encoder. The encoding process is: read a frame of data, take a macro block, select the encoding type according to the encoding control, whether it is intra encoding intra or inter encoding inter, if it is an I frame, all macroblocks are intra-frame coded intra, the read macroblock data directly enters the discrete cosine transform DCT, quantization Q, DC coefficients and AC coefficients DC/AC prediction, run-length coding RLC and combined with other information to form Code stream; if it is a P frame, perform motion estimation ME first, and then determine whether it is intra-frame encoding intra or inter-frame encoding inter, if intra-frame encoding intra, directly use the macro block itself to perform a series of data such as discrete cosine transform DCT Processing, if it is inter-frame coding inter, the motion vector MV obtained by the motion estimation ME is sent to the motion compensation MC unit, and the reconstructed frame data of the previous frame in the frame buffer is combined with the pixel value of the current macroblock to do the calculation, and get The residual data, then, the residual value is subjected to discrete cosine transform DCT, quantization Q, DC coefficient and AC coefficient DC/AC prediction, run-length coding RLC and combined with other information to form a code stream, that is, the coded video data.

369 Step K: Send the encoded video data to the main device, enter step L, and execute steps H to K in a loop until new function mode information is received or the session ends.

371 Step L: Determine whether to adjust the video quality mode according to whether the new video quality information is received, if yes, determine the MPEG4 coding parameters according to the new video quality information, and return to step H; otherwise, go to step M.

- 374 Step M: Determine whether to adjust the function mode according to whether the new function mode information is received. If yes, return to step C to communicate in the new function mode; otherwise, go to step N.
- 377 Step N: Determine whether to end the session according to whether an end command is received, if yes, the session ends, otherwise the session continues.
- 379 The above embodiment is only a specific embodiment of the present invention, and is not used to limit the scope of implementation of the present invention, that is, all equivalent changes and modifications made in accordance with the content of the present invention, or those of ordinary skill in the art can learn from the disclosure of the present invention. All deformations obtained directly or imagined should be considered as the protection scope of the present invention.



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## CLAIMS CN102088593A

1.

13 An MPEG4 compressed video transmission communication system based on the Bluetooth 3.0 specification, including: a Bluetooth control module (107), used to establish a wireless communication channel, the channel includes a control channel, a video channel and an audio channel, the control channel is used in the Bluetooth 3.0 automatic Send or receive control commands in the group network; the video channel is used to send or receive encoded video data in the Bluetooth 3.0 ad hoc network; the audio channel is used to send or receive audio data in the Bluetooth 3.0 ad hoc network, and will receive The commands and data are transmitted to the ARM end processing control module; the video acquisition module (101) is used to collect on-site video information, convert the analog information of the video image into digital video data, and transmit the converted video data to ARM processing control module; audio acquisition and playback module (103), used to collect real-time audio data and play the received audio data, and transmit the collected real-time audio data to the ARM processing control module; interface operation module (106), used For displaying video images and user graphical interfaces, mouse or touch control is used to generate control commands, and the control commands are transmitted to the ARM processing control module. The user graphical interface display content includes the video display area (109), the switch function mode button area ( 110), switch the video quality button area (111), call device selection area (112) and current status display area (113); DSP end video codec module (102), used to encode and decode video data with MPEG4, The decoded video data is sent to the ARM processing control module; the ARM processing control module (104) is used to receive and process control commands from the interface operation module and Bluetooth control module, video data from the video acquisition module, and audio Collect the audio data of the playback module, the video data and audio data from the Bluetooth control module, and the video data from the DSP video codec module; the external storage module (105) contains a file system with a log structure for storing the system' s data Control program, operating system, control command and encoded video data.

2.

38 The video transmission communication system according to claim 1, characterized in that the Bluetooth control module (107) adopts the Bluetooth 3.0 standard to send and receive data in the self-organizing network.

3.

44 The video transmission communication system according to claim 1, characterized in that the switch function mode button area (110) includes remote recording, video call, intercom mode, wireless monitoring mode, and buttons for opening stored video files .

4.

50 The video transmission communication system according to claim 1, characterized in that the switch video quality button area (111) includes high-definition MJPEG images, real-time clear video, real-time normal video, and a button for initiating a session and an exit button.

5.

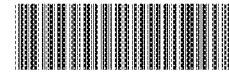
56 A method for controlling the initiator of MPEG4 compressed video transmission communication based on Bluetooth 3.0 specification, including the following steps: 1) Display a user graphical interface; 2) Select the device that needs to communicate, and send a connection request to the selected device; 3) According to Whether the selected device accepts the connection request to determine whether to establish a communication channel between the master and slave devices, if yes, the communication connection is established, otherwise, reselect the device that needs to communicate and send the connection request; 4) Select the function mode to send the connected slave device Send the selected mode information, and determine the channel according to the selected function mode: In the remote recording and wireless monitoring mode, open the video channel and go to step 9); In the intercom mode, open the audio channel and go to step 5); In the video call mode, open the video channel and audio channel at the same time, and perform steps 5) and 9) in parallel; 5) Start collecting audio data; 6) Send the collected audio data to the slave device; 7) Receive the data sent from the slave device 8) Play the audio data in the received audio data packet, skip to step 13), and repeat steps 5) ~ 8) at the same time, until the user switches the function mode or the session ends; 9) Receive slave device The encoded video data packet sent over, extract the video data in the data packet, and decide whether to store the video data according to the user's choice, if it is, store the video data to the external storage module, otherwise it will not be stored; 10) For slave data The video data extracted from the package is decoded; 11) The decoded video data is displayed in the video display area of the interface operation module, and then enters step 12), and at the same time, steps 9) to 11) are executed in a loop until the user switches the function mode or End of the session; 12) Determine whether to adjust the video quality mode according to the user's choice, if yes, send the new mode information to the slave device, and return to step 9), otherwise go to step 13); 13) Determine whether to adjust the function according to the user's choice Mode, if yes, return to step 4), otherwise, proceed to step 14); 14) Determine whether to end the session according to the user's choice, if yes, send an end command to the slave device, the session ends, otherwise continue the session;

6.

83 A receiving end control method of MPEG4 compressed video transmission communication based on Bluetooth 3.0 specification, including the following steps: (1) Display a user graphical interface; (2) Determine whether to respond to the connection request from the main device according to the user's choice, and if it responds Establish the communication channel of the master and slave device, go to step (3), otherwise continue to wait for a new connection request; (3) Receive the mode information from the master device, and determine the communication steps according to the mode information: For remote recording and wireless monitoring mode, execute Step (8); For intercom mode, perform step (4); For visual call mode, perform step (4) and step (8) in parallel; (4) Start collecting audio data; (5) Send the collected audio Data; (6) Receive audio data packets sent via Bluetooth; (7) Play the received audio data, jump to step (13), and perform steps (4) ~ (7) in a loop until a new one is received Function mode information or end of the session; (8) Collect original video data; (9) Display the original video data in the video display area of the interface operation module; (10) Perform MPEG4 encoding on the original video data; (11) Sending process Give the encoded video data to the main device, go to step (12), and perform steps (8) to (11) in a loop until the new function mode information is received or the session ends; (12) According to whether new video quality information is received Determine whether to adjust the video quality mode, if so, determine the MPEG4 encoding parameters according to the new video quality information, and return to step (8), otherwise go to step (13); (13) Determine whether to adjust according to whether the new function mode information is received In functional mode, if yes, return to step (3), otherwise go to step (14); (14) Determine whether to end the session according to whether an end command is received, if yes, the session ends, otherwise continue the session.



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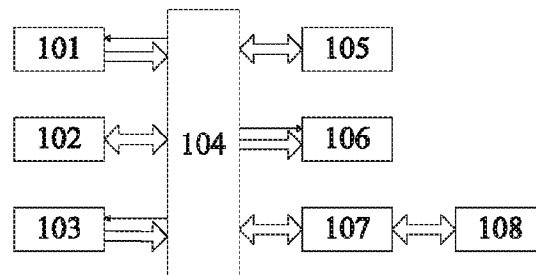
权利要求书 3 页 说明书 8 页 附图 4 页

### (54) 发明名称

基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信系统及方法

### (57) 摘要

本发明公开了一种基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信系统,主要解决现有视频传系统通信流畅度低和功能模式单一的问题。该通信系统包括视蓝牙控制模块、视频采集模块、音频采集播放模块、ARM 端处理控制模块、DSP 端视频编解码模块、界面操作模块和外部存储模块;ARM 端处理控制模块接收音频采集播放模块和视视频采集模块采集的音视频数据,DSP 端视频编解码模块对 ARM 端处理控制模块发送的数据进行编解码并将编码后的视频数据存储在外部存储模块,将需要传送的数据通过蓝牙控制模块发送或接收,通过界面操作模块显示视频数据和用户图形界面。本发明功能模式多,适应多种不同的环境,可用于中短距离的自组网络视频语音传输。



CN 102088593 A

1. 一种基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信系统,包括:

蓝牙控制模块 (107),用于建立无线通信信道,该信道包括控制信道、视频信道和音频信道,控制信道用于在蓝牙 3.0 自组网络内发送或接收控制命令;视频信道用于在蓝牙 3.0 自组网络内发送或接收编码后的视频数据;音频信道用于在蓝牙 3.0 自组网络内发送或接收音频数据,并将接收到的命令和数据传送给 ARM 端处理控制模块;

视频采集模块 (101),用于采集现场的视频信息,将视频图像的模拟信息转化为数字形式的视频数据,并将转化后的视频数据传输给 ARM 端处理控制模块;

音频采集播放模块 (103),用于采集实时音频数据和播放接收到的音频数据,并将采集实时音频数据传输给 ARM 端处理控制模块;

界面操作模块 (106),用于显示视频图像和用户图形界面,利用鼠标或触摸控制来产生控制命令,并将控制命令传输给 ARM 端处理控制模块,用户图形界面显示内容包括视频显示区域 (109)、切换功能模式按钮区域 (110)、切换视频质量按钮区域 (111)、通话设备选择区域 (112) 和当前状态显示区域 (113);

DSP 端视频编解码模块 (102),用于对视频数据进行 MPEG4 编解码,将编解码后的视频数据送到 ARM 端处理控制模块;

ARM 端处理控制模块 (104),用于接收和处理来自于界面操作模块和蓝牙控制模块的控制命令、来自视频采集模块的视频数据、来自音频采集播放模块的音频数据、来自蓝牙控制模块的视频数据和音频数据和来自 DSP 端视频编解码模块的视频数据;

外部存储模块 (105),包含有日志结构的文件系统,用于存储本系统的控制程序、操作系统、控制命令和编码后的视频数据。

2. 根据权利要求 1 所述的视频传输通信系统,其特征在于蓝牙控制模块 (107),采用蓝牙 3.0 标准进行自组网络内的收发数据。

3. 根据权利要求 1 所述的视频传输通信系统,其特征在于所述的切换功能模式按钮区域 (110),包括远程录像、可视通话、对讲模式、无线监控模式以及打开已经存储视频文件的按钮。

4. 根据权利要求 1 所述的视频传输通信系统,其特征在于所述的切换视频质量按钮区域 (111),包括高清 MJPEG 图像、实时清晰视频、实时普通视频以及发起会话按钮、退出按钮。

5. 一种基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信的发起端控制方法,包括如下步骤:

1) 显示用户图形界面;

2) 选择需要通信的设备,并向所选的设备发送连接请求;

3) 根据所选设备是否接受连接请求来决定是否建立起主从设备间的通信信道,如果是则通信连接建立,否则重新选择需要通信的设备发送连接请求;

4) 选择功能模式,向已经连接的从设备发送所选择的模式信息,并根据所选功能模式确定信道;

在远程录像和无线监控模式下,开通视频信道,执行步骤 9);

在对讲模式下,开通音频信道执行步骤 5);

在可视通话模式下,同时开通视频信道和音频信道,并行的执行步骤 5) 和步骤 9);



- 5) 开始采集音频数据；
  - 6) 发送采集到的音频数据给从设备；
  - 7) 接收从设备发送过来的音频数据包；
  - 8) 播放接收到的音频数据包中的音频数据,跳转到步骤 13),同时循环执行步骤 5) ~ 8),直到用户切换功能模式或会话结束；
  - 9) 接收从设备发送过来的经过编码的视频数据包,提取数据包中的视频数据,根据用户的选择决定是否存储该视频数据,如果是则存储该视频数据到外部存储模块,否则不存储；
  - 10) 对从数据包中提取出的视频数据进行解码；
  - 11) 将解码后的视频数据显示在界面操作模块的视频显示区域,进入到步骤 12),同时循环执行步骤 9) ~ 11),直到用户切换功能模式或会话结束；
  - 12) 根据用户的选择确定是否调整视频质量模式,如果是则发送新的模式信息给从设备,返回到步骤 9),否则进入步骤 13)；
  - 13) 根据用户的选择确定是否调整功能模式,如果是则返回到步骤 4),否则进入步骤 14)；
  - 14) 根据用户选择决定是否结束会话,如果是则发送结束命令给从设备,会话结束,否则继续会话；
6. 一种基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信的接收端控制方法,包括如下步骤：
- (1) 显示用户图形界面；
  - (2) 根据用户的选择决定是否响应来自主设备的连接请求,如果响应则建立起主从设备的通信信道,进入步骤 (3),否则继续等待新的连接请求；
  - (3) 接收来自主设备的模式信息,根据模式信息确定通信步骤：  
对于远程录像和无线监控模式,执行步骤 (8)；  
对于对讲模式,执行步骤 (4)；  
对于可视通话模式,并行执行步骤 (4) 和步骤 (8)；
  - (4) 开始采集音频数据；
  - (5) 发送采集到的音频数据；
  - (6) 接收通过蓝牙发送过来的音频数据包；
  - (7) 播放接收到的音频数据,跳转到步骤 (13),同时循环执行步骤 (4) ~ (7),直到接收到新的功能模式信息或会话结束；
  - (8) 采集原始视频数据；
  - (9) 将原始的视频数据显示在界面操作模块的视频显示区域；
  - (10) 对原始的视频数据进行 MPEG4 编码；
  - (11) 发送经过编码的视频数据给主设备,进入步骤 (12),同时循环执行步骤 (8) ~ (11),直到接收到新的功能模式信息或会话结束；
  - (12) 根据是否接收到新的视频质量信息确定是否调整视频质量模式,如果是则根据新的视频质量信息确定 MPEG4 的编码参数,返回步骤 (8),否则进入步骤 (13)；
  - (13) 根据是否接收到新的功能模式信息确定是否调整功能模式,如果是则返回步骤

(3), 否则进入步骤 (14) ;

(14) 根据是否接收到结束命令确定是否结束会话, 如果是则会话结束, 否则继续会话。

## 基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信系统及方法

### 技术领域

[0001] 本发明属于无线通信技术领域,涉及视频压缩技术和实时视频和语音的传输,尤其涉及利用蓝牙 3.0 无线传输技术的视频传输通信系统,可用于中短距离的自组网络视频语音传输。

### 背景技术

[0002] 2009 年 4 月 21 日,蓝牙技术联盟正式颁布了蓝牙核心规范 3.0 版,作为新一代的蓝牙技术标准规范。蓝牙 3.0 的核心是一种全新的交替射频技术 AMP,它允许蓝牙协议栈针对任何一个任务动态地选择正确的射频。蓝牙 3.0 具有传输速度高的优点,通过集成“802.11PAL”协议适应层,使蓝牙 3.0 可在需要的时候调用 802.11Wi-Fi 实现高速数据传输,其数据传输率可提高到 24Mbps,是蓝牙 2.0 的八倍。

[0003] 近年来,无线信息通信已经成为人们生活中必不可少的部分,而视频和语音通信作为主要的信息载体,得到了越来越广泛的应用。现有的无线视频传输系统一般采用蓝牙 2.0 或 Wi-Fi 技术作为主要的通信网络,这两种方式都有各自的缺陷:传统的蓝牙 2.0 的通信范围较小,速率较低;而 Wi-Fi 技术的安全性较差,安全设计在使用上相对繁复。同时,现有的视频传输系统采用的视频压缩技术压缩模式单一,压缩率低,视频质量较差。这使得现有的视频通信系统具有以下缺陷:(1) 较大的传输范围和传输速率与较高的安全性两者不能兼得;(2) 兼容性较差;(3) 视频质量较差;(4) 视频通信模式单一,很难适应对于视频质量要求各异的环境。

### 发明内容

[0004] 本发明的目的在于避免上述已有技术上的不足,提供一种基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信系统,以在多种环境尤其是恶劣的环境下,快速的组建无线安全的通信网络,进行快速实时视频和语音的传输,并根据需要随时对图像质量进行调整,以传送多种形式的视频模式,满足多种通信形式对不同图像质量的需要。

[0005] 为实现上述目的,本发明的通信系统包括:

[0006] 蓝牙控制模块,用于建立无线通信信道,该信道包括控制信道、视频信道和音频信道,控制信道用于在蓝牙 3.0 自组网络内发送或接收控制命令;视频信道用于在蓝牙 3.0 自组网络内发送或接收编码后的视频数据;音频信道用于在蓝牙 3.0 自组网络内发送或接收音频数据,并将接收到的命令和数据传送给 ARM 端处理控制模块;

[0007] 视频采集模块,用于采集现场的视频信息,将视频图像的模拟信息转化为数字形式的视频数据,并将转化后的视频数据传输给 ARM 端处理控制模块;

[0008] 音频采集播放模块,用于采集实时音频数据和播放接收到的音频数据,并将采集实时音频数据传输给 ARM 端处理控制模块;

[0009] 界面操作模块,用于显示视频图像和用户图形界面,利用鼠标或触摸控制来产生控制命令,并将控制命令传输给 ARM 端处理控制模块,用户图形界面显示内容包括视频显

示区域、切换功能模式按钮区域、切换视频质量按钮区域、通话设备选择区域和当前状态显示区域；

[0010] DSP 端视频编解码模块,用于对视频数据进行 MPEG4 编解码,将编解码后的视频数据送到 ARM 端处理控制模块；

[0011] ARM 端处理控制模块,用于接收和处理来自于界面操作模块和蓝牙控制模块的控制命令、来自视频采集模块的视频数据、来自音频采集播放模块的音频数据、来自蓝牙控制模块的视频数据和音频数据和来自 DSP 端视频编解码模块的视频数据；

[0012] 外部存储模块,包含有日志结构的文件系统,用于存储本系统的控制程序、操作系统、控制命令和编码后的视频数据。

[0013] 本发明基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信系统的控制方法,包括发起端控制方法和接收端控制方法,其中：

[0014] A. 发起端控制方法包括以下步骤：

[0015] A1) 显示用户图形界面；

[0016] A2) 选择需要通信的设备,并向所选的设备发送连接请求；

[0017] A3) 根据所选设备是否接受连接请求来决定是否建立起主从设备间的通信信道,如果是则通信连接建立,否则重新选择需要通信的设备发送连接请求；

[0018] A4) 选择功能模式,向已经连接的从设备发送所选择的模式信息,并根据所选功能模式确定信道；

[0019] 在远程录像和无线监控模式下,开通视频信道,执行步骤 A9)；

[0020] 在对讲模式下,开通音频信道执行步骤 A5)；

[0021] 在可视通话模式下,同时开通视频信道和音频信道,并行的执行步骤 A5) 和步骤 A9)；

[0022] A5) 开始采集音频数据；

[0023] A6) 发送采集到的音频数据给从设备；

[0024] A7) 接收从设备发送过来的音频数据包；

[0025] A8) 播放接收到的音频数据包中的音频数据,跳转到步骤 A13),同时循环执行步骤 A5) ~ A8),直到用户切换功能模式或会话结束；

[0026] A9) 接收从设备发送过来的经过编码的视频数据包,提取数据包中的视频数据,根据用户的选择决定是否存储该视频数据,如果是则存储该视频数据到外部存储模块,否则不存储；

[0027] A10) 对从数据包中提取出的视频数据进行解码；

[0028] A11) 将解码后的视频数据显示在界面操作模块的视频显示区域,进入到步骤 A12),同时循环执行步骤 A9) ~ A11),直到用户切换功能模式或会话结束；

[0029] A12) 根据用户的选择确定是否调整视频质量模式,如果是则发送新的模式信息给从设备,返回到步骤 A9),否则进入步骤 A13)；

[0030] A13) 根据用户的选择确定是否调整功能模式,如果是则返回到步骤 A4),否则进入步骤 A14)；

[0031] A14) 根据用户选择决定是否结束会话,如果是则发送结束命令给从设备,会话结束,否则继续会话。

- [0032] B. 接收端控制方法包括以下步骤：
- [0033] B1) 显示用户图形界面；
- [0034] B2) 根据用户的选择决定是否响应来自主设备的连接请求，如果响应则建立起主从设备的通信信道，进入步骤 B3)，否则继续等待新的连接请求；
- [0035] B3) 接收来自主设备的模式信息，根据模式信息确定通信步骤；
- [0036] 对于远程录像和无线监控模式，执行步骤 B8)；
- [0037] 对于对讲模式，执行步骤 B4)；
- [0038] 对于可视通话模式，并行执行步骤 B4) 和步骤 B8)；
- [0039] B4) 开始采集音频数据；
- [0040] B5) 发送采集到的音频数据；
- [0041] B6) 接收通过蓝牙发送过来的音频数据包；
- [0042] B7) 播放接收到的音频数据，跳转到步骤 B3)，同时循环执行步骤 B4) ~ B7)，直到接收到新的功能模式信息或会话结束；
- [0043] B8) 采集原始视频数据；
- [0044] B9) 将原始的视频数据显示在界面操作模块的视频显示区域；
- [0045] B10) 对原始的视频数据进行 MPEG4 编码；
- [0046] B11) 发送经过编码的视频数据给主设备，进入步骤 B12)，同时循环执行步骤 B8) ~ B11)，直到接收到新的功能模式信息或会话结束；
- [0047] B12) 根据是否接收到新的视频质量信息确定是否调整视频质量模式，如果是则根据新的视频质量信息确定 MPEG4 的编码参数，返回步骤 B8)，否则进入步骤 B13)；
- [0048] B13) 根据是否接收到新的功能模式信息确定是否调整功能模式，如果是则返回步骤 B3)，否则进入步骤 B14)；
- [0049] B14) 根据是否接收到结束命令确定是否结束会话，如果是则会话结束，否则继续会话。
- [0050] 本发明具有如下优点：
- [0051] 1. 本发明中采用蓝牙 3.0 自组网络，网络覆盖范围更大，传送速率更快，安全性更高。
- [0052] 2. 本发明采用 MPEG4 视频编解码技术，在相同压缩率下具有更高的清晰度，更加节省存储空间，当网络进行传输有误码或丢包现象时，MPEG4 受到的影响很小，并且能够很快恢复。
- [0053] 3. 本发明设计了 4 种功能模式及 3 种视频质量模式，优化了在不同环境下视频显示的流畅性和图像质量，满足了多种复杂的环境。
- [0054] 4. 本发明利用用户图形界面的状态提示窗口来显示当前模式的信息状态，包括当前功能模式情况、当前视频质量情况、通信从设备编号、当前视频音频传送速率和编解码帧率，能明确表示本系统用户与无线网络中其他终端的连接情况，使本系统的用户可直观的了解整个无线网络环境，有利于用户根据需要做出合理的功能选择。
- [0055] 5. 本发明不仅实现了无线网络中的视频会话，还能够对视频数据有选择的进行保存，便于重复观看。
- [0056] 6. 本发明的外部存储模块由于包含有日志结构的文件系统，保证了当意外掉电时



不会丢失数据的特性。

#### 附图说明

- [0057] 图 1 是现有蓝牙系统提供的连接方式图；  
[0058] 图 2 是本发明的系统结构示意图；  
[0059] 图 3 是本发明的用户图形界面布局示意图；  
[0060] 图 4 是本发明使用的 MPEG4 视频编码器框图；  
[0061] 图 5 是本发明会话发起端对视频传输通信的控制流程图；  
[0062] 图 6 是本发明会话接收端对视频传输通信的控制流程图。

#### 具体实施方式

[0063] 本发明利用现有蓝牙 3.0 系统提供的连接方式,如图 1 所示,实现快速安全自组局域网网络。其中图 1a 为点对点连接方式;图 1b 为点对多点连接方式组成的微网,其中一个单元作为微网主单元,其它为微网从单元;图 1c 为多个有重叠的微网构成的一个散网。

[0064] 参照图 2,图中双箭头为数据线,单箭头为控制线,本发明所述通信系统主要由视频采集模块 101, DSP 端视频编解码模块 102, 音频采集播放模块 103, ARM 端处理控制模块 104, 外部存储模块 105, 界面操作模块 106, 蓝牙控制模块 107 和蓝牙天线 108 组成。其中:

[0065] 视频采集模块 101,可采用普通的摄像头或数字摄像头,本实例采用但不局限于普通的 CCD 摄像头和硬件 A/D 转换器,该硬件 A/D 转化装置采用 TI 公司的视频解码芯片 TVP5146 完成模拟视频数据到数字视频数据的转换,该芯片允许 10 路模拟视频输入,具有 4 路 10bit A/D 转换器,场同步信号,行同步信号,奇偶场信号,时钟输出信号均由引脚直接引出,省去了同步时钟电路的设计。

[0066] DSP 端视频编解码模块 102 与 ARM 端处理控制模块 104,采用但不局限于 TI 公司的内嵌 ARM 和 DSP 双核结构嵌入式开发平台来实现,与其它利用单一处理器实现应用功能的结构方案相比,这种方案具有一个明显的优势,即可以提高功率和效率,并延长用户的电池寿命。这是因为: DSP 芯片是专门为处理实时视频信号而设计和定制的,采用两个处理器可以将总工作负荷进行合理划分,从而降低时钟工作频率,减小功率消耗,进一步降低系统成本。

[0067] 音频采集播放模块 103,采用普通耳麦构成。

[0068] 外部存储模块 105,采用任何一种 flash 芯片,本实例采用 64M 的 nand flash 芯片,并采用 linux 操作系统,为了使 flash 芯片具有所述的存储功能,还必须建立 linux 根文件系统,该根文件系统可采用 Cramfs、JFFS2、RAM disk 和 Ext2。本发明实例采用 JFFS2 根文件系统。

[0069] 界面操作模块 106,采用任何普通的电阻式或电容式显示屏,只需要有相应的驱动,本实例采用 4 线电阻式触摸屏,采用 3.5 英寸的 TFT 真彩液晶屏。参照图 3,本实例界面操作模块 106 的用户图形界面分为视频显示区域 109、切换功能模式按钮区域 110、切换视频质量按钮区域 111、通话设备选择区域 112、当前状态显示区域 113,本实例中,用户可浏览已存储的视频文件,选择打开,选择想要播放的文件即可,视频内容会在界面中间的视频显示区域 109 显示。

[0070] 蓝牙控制模块 107, 采用任何符合蓝牙 3.0 规范的适配器, 本实例采用蓝牙 3.0 USB 适配器。

[0071] 蓝牙天线 108, 采用外接 SMA 天线。

[0072] 上述模块的连接关系如下:

[0073] 视频采集模块 101 与 ARM 端处理控制模块 104 相连, ARM 端处理控制模块 104 接收视频采集模块 101 采集的原始视频数据; DSP 端视频编解码模块 102 与 ARM 端处理控制模块 104 相连, DSP 端视频编解码模块 102 对 ARM 端处理控制模块 104 传送过来的视频数据进行编解码, 并将编解码后的视频数据送回 ARM 端处理控制模块 104; 音频采集播放模块 103 与 ARM 端处理控制模块 104 相连, ARM 端处理控制模块 104 接收音频采集播放模块 103 采集的音频数据, 并将需要播放音频数据传送给音频采集播放模块 103 进行播放; 外部存储模块 105 与 ARM 端处理控制模块 104 相连, ARM 端处理控制模块 104 运行外部存储模块 105 存储的本系统的控制程序和操作系统, 外部存储模块 105 存储 ARM 端处理控制模块 104 需要保存的视频数据; 界面操作模块 106 与 ARM 端处理控制模块 104 相连, 界面操作模块 106 显示用户图形界面和 ARM 端处理控制模块 104 接收到的需要显示的视频数据, ARM 端处理控制模块 104 处理界面操作模块 106 产生的控制命令; 蓝牙控制模块 107 与 ARM 端处理控制模块 104 相连, ARM 端处理控制模块 104 将接收到的音频数据和编码后的视频数据给蓝牙控制模块 107 发送, 同时蓝牙控制模块 107 接收编码后的视频数据给 ARM 端处理控制模块 104 处理; 蓝牙天线 108 与蓝牙控制模块 107 相连。上述的各个模块可集成在一块 PCB 电路板上, 界面操作模块 106 置于其他模块之上, 以达到本发明的小型化。

[0074] 参照图 5, 本发明基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信的发起端控制方法, 包括以下步骤:

[0075] 步骤 1, 显示用户图形界面, 该用户图形界面分为视频显示区域、功能模式按钮区域、视频质量按钮区域、通话设备选择区域和当前状态显示区域, 用户可浏览已存储的视频文件, 选择打开, 选择想要播放的文件即可, 视频内容会在界面中间的视频显示区域显示。

[0076] 步骤 2, 用户在图形界面上选择需要通信的设备, 点击发起连接按钮, 向所选的设备发送连接请求。

[0077] 步骤 3, 等待所选设备响应, 根据该设备是否接受连接请求来决定是否建立起主从设备间的通信信道。

[0078] 通信设备在接收到本系统发送的连接请求后, 其用户图形界面会提示出消息对话框, 该消息对话框内容包括: 请求连接的设备名称、接受按钮和拒绝按钮, 用户接受连接则点击接受按钮, 通信连接建立, 否则点击拒绝按钮, 用户选择后, 会向连接请求方反馈所选信息。

[0079] 本系统接收通信设备的反馈信息, 如果连接被接受则建立起主从设备间的通信信道, 其中连接发起方为通信主设备, 连接接受方为通信从设备。如果连接被拒绝则选择新的通信设备, 重新发起连接。

[0080] 步骤 4, 通信连接建立后, 用户点击功能模式区域的按钮选择功能模式。

[0081] 本发明功能模式包括: 远程录像、无线监控、对讲模式和可视通话, 在远程录像的模式下系统默认存储从设备发送过来的视频数据, 在其它模式下用户根据需要进行选择是否保存发送过来的视频数据, 选择后, 系统向已经连接的从设备发送 所选择的模式信息, 并根

据所选功能模式确定步骤：

[0082] 4a) 在远程录像和无线监控模式下, 开通视频信道, 执行步骤 9；

[0083] 4b) 在对讲模式下, 开通音频信道执行步骤 5；

[0084] 4c) 在可视通话模式下, 同时开通视频信道和音频信道, 并行的执行步骤 5 和步骤 9。

[0085] 步骤 5, 通过麦克风采集现场音频数据。

[0086] 步骤 6, 将采集到的音频数据打包, 并通过蓝牙控制模块发送给从设备。

[0087] 步骤 7, 接收从设备发送过来的音频数据包, 提取音频数据包中的音频数据。

[0088] 步骤 8, 通过耳机播放提取出的音频数据, 跳转到步骤 13, 同时循环执行步骤 5 ~ 8, 直到用户切换功能模式或会话结束。

[0089] 步骤 9, 通过蓝牙控制模块接收从设备发送过来的经过 MPEG4 编码的视频数据包, 提取数据包中的视频数据, 根据用户的选择决定是否存储该视频数据, 如果是则存储该视频数据到外部存储模块, 否则不存储；

[0090] 步骤 10, 对从数据包中提取出的视频数据进行 MPEG4 解码。

[0091] 步骤 11, 将解码后的视频数据显示在界面操作模块的视频显示区域, 进入到步骤 12, 同时循环执行步骤 9 ~ 11, 直到用户切换功能模式或会话结束。

[0092] 步骤 12, 用户点击视频质量按钮区域的按钮调节视频质量模式。

[0093] 本发明的用户图形界面中视频质量模式根据无线网络的环境分别命名高清 MJPEG 图像、实时清晰视频、实时普通视频 3 种模式。每个视频模式分别封装了不同的视频参数以适应不同的网络环境。在高清 MJPEG 图像传送时, 帧率为 3fp/s 图像分辨率为 1024x768, 图像缺乏实时性, 但图像清晰, 可满足用户在网络通信较差的情况下对场景细节的需要；实时清晰视频, 帧率为 25fp/s, 图像分辨率为 720x480, 可在网络运行状态好的流畅的进行较清晰的视频会话；实时普通视频, 帧率为 25fp/s, 图像分辨率为 352x288, 可在网络运行较差的保证视频会话可以流畅进行。

[0094] 如果用户选择所述的三种视频质量模式中的一种, 且与当前视频质量模式不同, 则发送所选模式信息给从设备, 返回到步骤 9, 否则进入步骤 13。

[0095] 步骤 13, 在通信过程中, 用户根据需要随时切换功能模式, 如果用户选择与现有功能模式不同的模式, 返回到步骤 4, 否则进入步骤 14。

[0096] 步骤 14, 用户点击界面操作模块上的断开连接按钮结束会话, 如果用户结束会话则发送结束命令给从设备, 会话结束, 否则继续会话。

[0097] 参照图 6, 本发明基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信的接收端控制方法, 包括以下步骤：

[0098] 步骤 A, 显示用户图形界面, 该用户图形界面分为视频显示区域、功能模式按钮区域、视频质量按钮区域、通话设备选择区域和当前状态显示区域, 用户可浏览已存储的视频文件, 选择打开, 选择想要播放的文件即可, 视频内容会在界面中间的视频显示区域显示。

[0099] 步骤 B, 等待其他设备的连接请求, 本系统在接收到其他设备发送的连接请求后, 其用户图形界面会提示出消息对话框, 该消息对话框内容包括：请求连接的设备名称、接受按钮和拒绝按钮, 用户接受连接则点击接受按钮, 建立起主从设备间的通信信道, 其中连接发起方为通信主设备, 连接接受方为通信从设备, 如果用户拒绝连接则点击拒绝按钮, 用户



选择后,会向连接请求方反馈所选信息。

[0100] 如果通信连接建立,进入步骤 C,否则继续等待新的连接请求。

[0101] 步骤 C,接收来自主设备的模式信息,模式信息包括:功能模式和视频质量模式,其中:

[0102] 功能模式包括:远程录像、无线监控、对讲模式和可视通话;

[0103] 视频质量模式包括:高清 MJPEG 图像、实时清晰视频、实时普通视频 3 种模式。每个视频模式分别封装了不同的视频编码参数以适应不同的网络环境。在高清 MJPEG 图像传送时,帧率为 3fp/s 图像分辨率为 1024x768,图像缺乏实时性,但图像清晰,可满足用户在网络通信较差的情况下对场景细节的需要;实时清晰视频,帧率为 25fp/s,图像分辨率为 720x480,可在网络运行状态好的流畅的进行较清晰的视频会话;实时普通视频,帧率为 25fp/s,图像分辨率为 352x288,可在网络运行较差的保证视频会话可以流畅进行。

[0104] 根据接收到的模式信息确定通信步骤:

[0105] C1) 对于远程录像和无线监控模式,执行步骤 H;

[0106] C2) 对于对讲模式,执行步骤 D;

[0107] C3) 对于可视通话模式,并行执行步骤 D 和步骤 H。

[0108] 步骤 D,通过麦克风采集现场音频数据。

[0109] 步骤 E,将采集到的音频数据打包,并通过蓝牙控制模块发送给从设备。

[0110] 步骤 F,接收从设备发送过来的音频数据包,提取音频数据包中的音频数据。

[0111] 步骤 G,通过耳机播放接收到的音频数据,跳转到步骤 M,同时循环执行步骤 D~G,直到接收到新的功能模式信息或会话结束。

[0112] 步骤 H,从普通的 CCD 摄像头采集原始的现场视频频信息,并通过硬件 A/D 转化器将其转化成数字形式的原始视频数据。

[0113] 步骤 I,将原始视频数据显示在界面操作模块的视频显示区域。

[0114] 步骤 J,对原始的视频数据进行 MPEG4 编码。

[0115] 本发明采用 MPEG4 作为视频编解码算法,MPEG4 在三方面优于其他压缩/解压缩方案。首先,由于在一开始它就是作为一个国际化的标准来研究制定,所以具有很好的兼容性;其次,MPEG4 能够比其他算法提供更好的压缩比,最高可达 200 : 1,更重要的是,MPEG4 在提供高压缩比的同时,对数据的损失很小。

[0116] 图 4 所示是 MPEG4 视频编码器的具体实现框图,其编码过程是:读取一帧数据,取一个宏块,根据编码控制选择编码类型,是帧内编码 intra,还是帧间编码 inter,如果是 I 帧,所有宏块都是帧内编码 intra,读取的宏块数据直接进入离散余弦变换 DCT、量化 Q、直流系数与交流系数 DC/AC 预测、行程编码 RLC 并与其他信息一起合成形成码流;如果是 P 帧,先进行运动估计 ME,再判断是帧内编码 intra,还是帧间编码 inter,如果是帧内编码 intra,则直接利用宏块本身进行离散余弦变换 DCT 等一系列数据处理,如果是帧间编码 inter,则将经过运动估计 ME 得到的运动矢量 MV 传送给运动补偿 MC 单元,结合帧缓存中的上一帧的重建帧数据与当前宏块的像素值做运算,得到残差数据,然后,对残差值进行离散余弦变换 DCT、量化 Q、直流系数与交流系数 DC/AC 预测、行程编码 RLC 并与其他信息一起合成形成码流,即编码后的视频数据。

[0117] 步骤 K,发送经过编码的视频数据给主设备,进入步骤 L,同时循环执行步骤 H~K,

直到接收到新的功能模式信息或会话结束。

[0118] 步骤 L, 根据是否接收到新的视频质量信息确定是否调整视频质量模式, 如果是则根据新的视频质量信息确定 MPEG4 的编码参数, 返回步骤 H, 否则进入步骤 M。

[0119] 步骤 M, 根据是否接收到新的功能模式信息确定是否调整功能模式, 如果是则返回步骤 C, 以新的功能模式进行通信, 否则进入步骤 N。

[0120] 步骤 N, 根据是否接收到结束命令确定是否结束会话, 如果是则会话结束, 否则继续会话。

[0121] 以上实施例只是本发明的一个具体实施例, 并非用来限定本发明的实施范围, 即凡依本发明内容的作的均等变化与修饰, 或本领域的普通技术人员能从本发明公开的内容直接得到的或联想到的所有变形, 均应认为是本发明的保护范围。

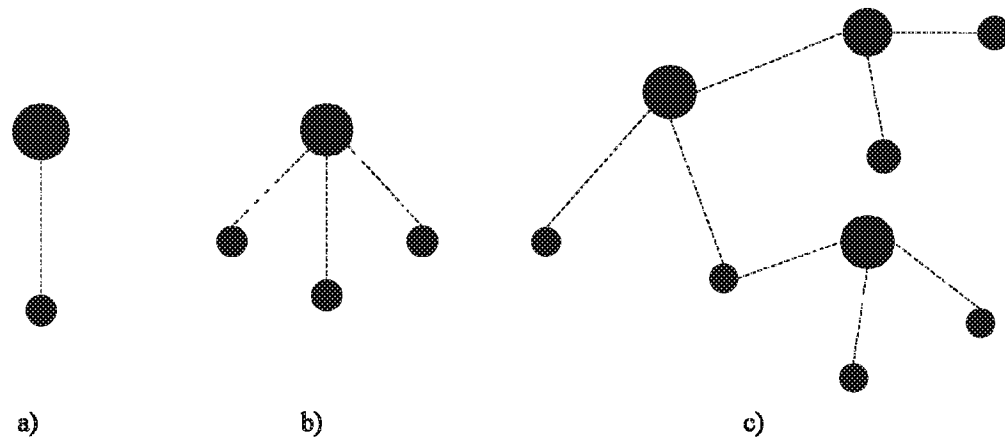


图 1

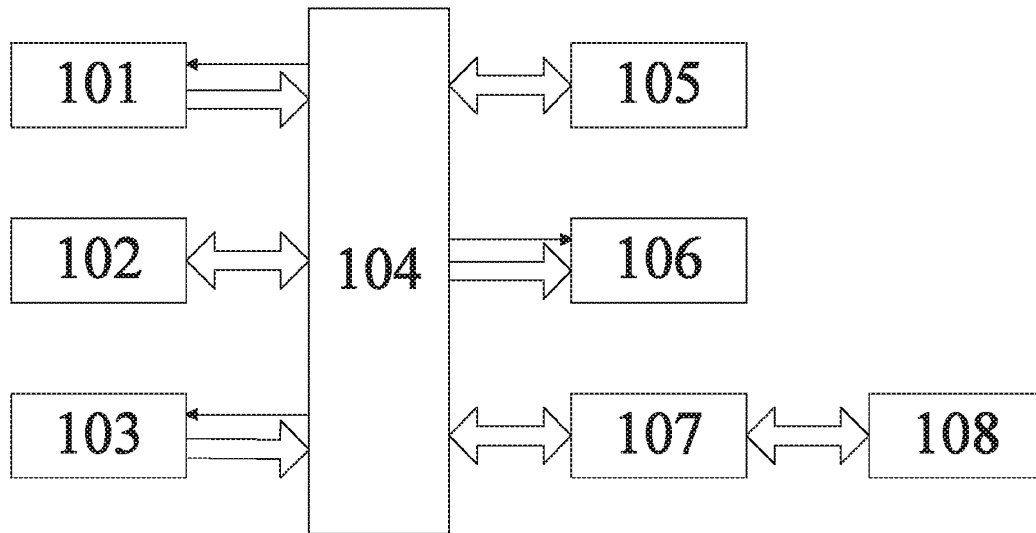


图 2



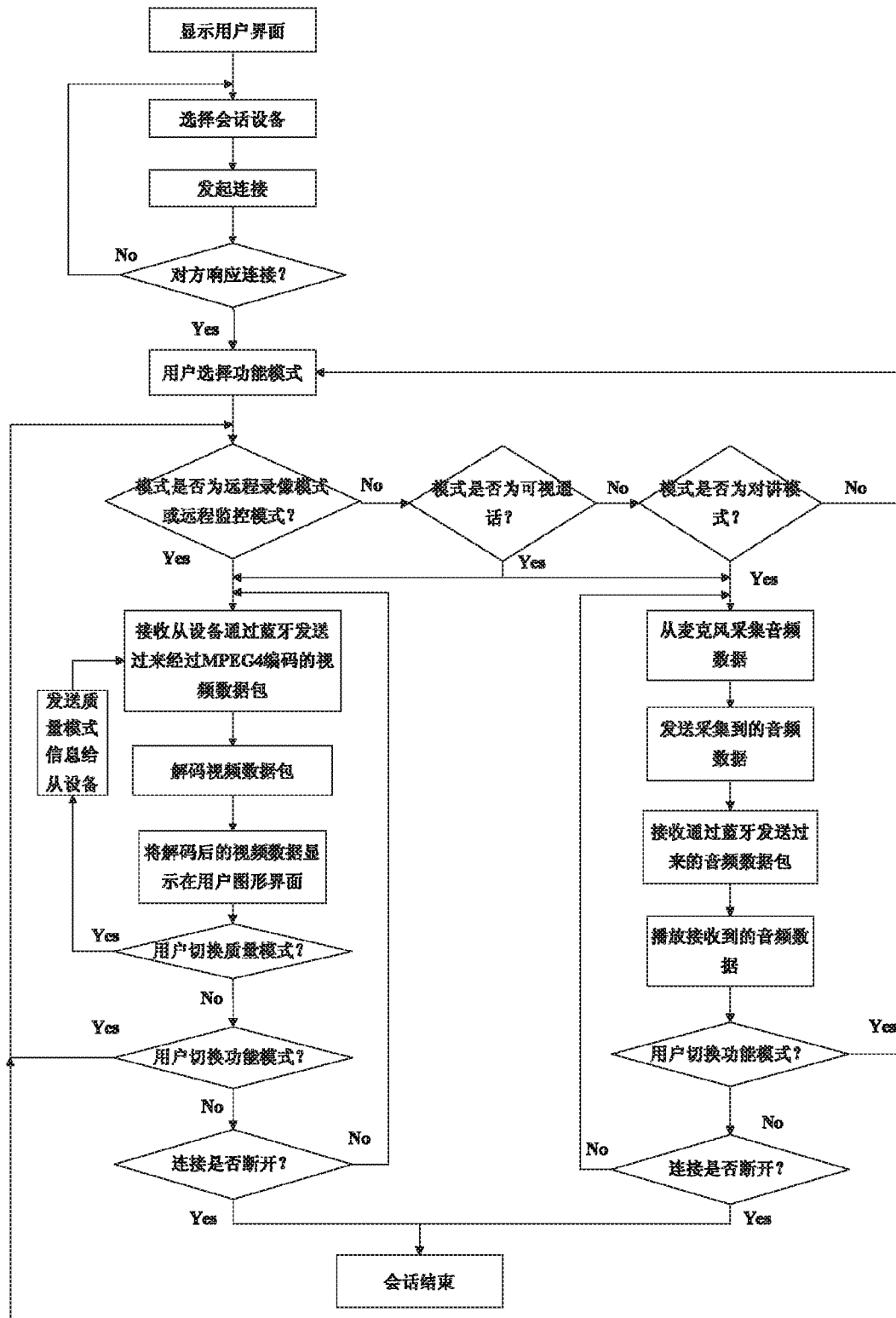


图 5

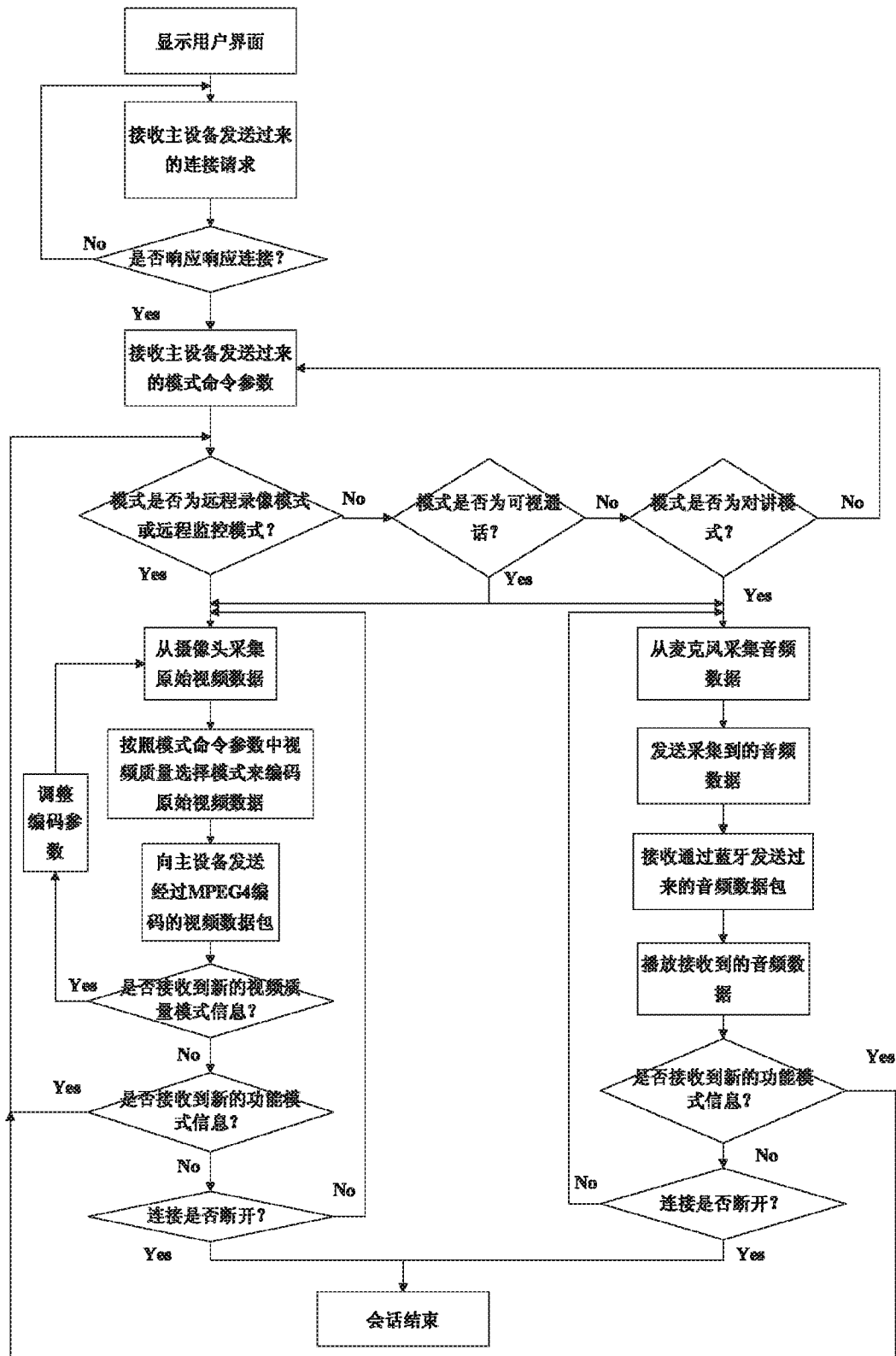
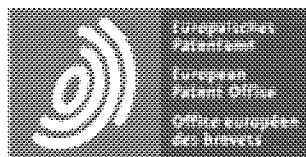


图 6



Espacenet

JP2007148904A METHOD, APPARATUS AND PROGRAM FOR PRESENTING INFORMATION

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METHOD, APPARATUS AND PROGRAM FOR PRESENTING INFORMATION

Abstract

<P>PROBLEM TO BE SOLVED: To present contents of information presented in the past by updating importance of display information in a retrieval interface during presentation. <P>SOLUTION: While the presentation information is displayed on a display apparatus, external data acquired through an input device are recorded and feature quantities are obtained from the external data. The importance is calculated by accumulating the feature quantities for each section in a period for displaying the presentation information. A first index information for a part of presentation information corresponding to the section having the importance exceeding a threshold is generated and presented along a time axis. The contents of the presentation information displayed in the past are retrieved in response to operations for selecting the first index information and displayed on a display apparatus. A second index information for a part of presentation information corresponding to the section selected is generated, and the second index information is added to the first index information listed along the time axis and presented. <P>COPYRIGHT: (C)2007,JPO&INPIT

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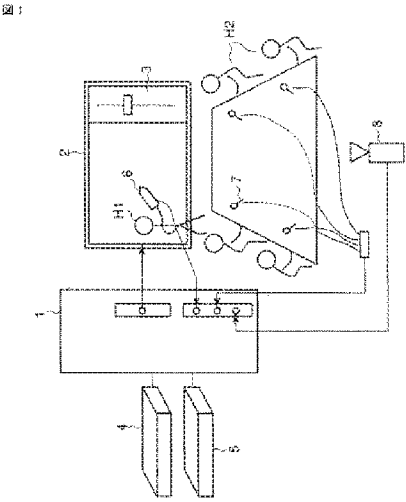
(54) 【発明の名称】 情報提示方法、情報提示装置及び情報提示プログラム

(57) 【要約】

【課題】プレゼンテーション中に検索インタフェースにおける表示情報の重要度を更新し、過去の情報提示内容を振り返って提示できるようにする。

【解決手段】ディスプレイ機器によるプレゼンテーション情報の表示中に、入力デバイスを通じて取得される外部データを記録し、この外部データから特徴量を求める。プレゼンテーション情報の表示期間における一定の区間ごとに特徴量を積算することにより重要度を算出する。閾値を超える重要度を有する区間に対応するプレゼンテーション情報の一部分の第1の見出し情報を生成し、時間軸に沿って並べて提示する。第1の見出し情報に対する選択操作に応じて、プレゼンテーション情報の過去の表示内容を検索し、ディスプレイ機器に表示する。そして、選択操作がなされた区間に対応するプレゼンテーション情報の一部分の第2の見出し情報を生成し、時間軸に沿って並べられた第1の見出し情報にこの第2の見出し情報を加えて提示する。

【選択図】 図1





( 2 )

特開2007-148904 (P2007-148904A)

## 【特許請求の範囲】

## 【請求項1】

ディスプレイ機器によるプレゼンテーション情報の表示中に、入力デバイスを通じて取得される外部データを記録するステップと、

前記外部データから特徴量を求めるステップと、

前記プレゼンテーション情報の表示期間における一定の区間ごとに、前記特徴量を積算することにより重要度を算出するステップと、

予め定められた閾値を超える重要度を有する区間に対応するプレゼンテーション情報の一部分の第1の見出し情報を生成するステップと、

生成された第1の見出し情報を時間軸に沿って並べて前記ディスプレイ機器に提示するステップと、

前記第1の見出し情報に対する前記入力デバイスを用いた選択操作に応じて、前記プレゼンテーション情報の過去の表示内容を検索するステップと、

検索された過去の表示内容を前記ディスプレイ機器に表示するステップと、

前記選択操作がなされた区間に対応するプレゼンテーション情報の一部分の第2の見出し情報を生成するステップと、

前記時間軸に沿って並べられた第1の見出し情報に前記生成された第2の見出し情報を加えて、前記ディスプレイ機器に提示するステップとを具備する情報提示方法。

## 【請求項2】

特徴量の種類に応じて異なる重要度算出比率を前記特徴量に乗じることにより前記重要度を算出する請求項1記載の情報提示方法。

## 【請求項3】

前記特徴量は、前記プレゼンテーション情報への注目度を反映しており、前記プレゼンテーション情報の表示時間の長さ又は前記プレゼンテーション情報に対して前記入力デバイスを通じて与えられた操作の量を表す請求項1記載の情報提示方法。

## 【請求項4】

前記プレゼンテーション情報が同じ内容を表示している時間がより長いほど前記重要度をより高くする請求項3記載の情報提示方法。

## 【請求項5】

前記重要度に寄与した特徴量の種類を表す文字列又はアイコンを表示するステップをさらに具備する請求項1記載の情報提示方法。

## 【請求項6】

前記重要度に応じた時間区間の長さを有する表示領域を含み、前記第1の見出し情報の選択操作に用いられるタイムライン・ユーザインタフェース画面を表示するステップをさらに具備する請求項1記載の情報提示方法。

## 【請求項7】

前記第1の見出し情報と前記第2の見出し情報との間を前記タイムライン・ユーザインタフェース画面において区別可能に表示するステップを具備する請求項6記載の情報提示方法。

## 【請求項8】

プレゼンテーション情報を表示するためのディスプレイ機器と、

前記ディスプレイ機器によるプレゼンテーション情報の表示中に外部データを取得するための入力デバイスと、

前記入力デバイスにより取得された外部データから特徴量を求めて記憶する特徴量記憶部と、

前記プレゼンテーションデータの表示期間における一定の区間ごとに、前記特徴量を積算することにより重要度を算出する重要度算出部と、

予め定められた閾値を超える重要度を有する区間に対応するプレゼンテーション情報の一部分の第1の見出し情報を生成する見出し情報生成部と、

生成された第1の見出し情報を時間軸に沿って並べて表示するよう前記ディスプレイ機器を制御し、前記第1の見出し情報に対する前記入力デバイスを用いた選択操作に応じて、前記プレゼンテーション情報の過去の提示内容を検索するタイムライン・ユーザインタフェースとを具備し、

前記見出し情報生成部は、前記選択操作がなされた区間に対応するプレゼンテーション情報の一部分の第2の見出し情報を生成し、

前記タイムライン・ユーザインタフェースは、前記時間軸に沿って並べられた第1の見出し情報に前記生成された第2の見出し情報を加えて提示するよう前記ディスプレイ機器を制御することを特徴とする情報提示装置。

【請求項9】

特徴量の種類に応じて異なる重要度算出比率を前記特徴量に乗じることにより前記重要度を算出する請求項8記載の情報提示装置。

【請求項10】

前記特徴量は、前記プレゼンテーション情報への注目度を反映しており、前記プレゼンテーション情報の表示時間の長さ又は前記プレゼンテーション情報に対して前記入力デバイスを通じて与えられた操作の量を表す請求項8記載の情報提示装置。

【請求項11】

前記プレゼンテーション情報が同じ内容を表示している時間がより長いほど前記重要度をより高くする請求項10記載の情報提示装置。

【請求項12】

前記タイムライン・ユーザインタフェースは、前記重要度に寄与した特徴量の種類を表す文字列又はアイコンを表示するよう前記ディスプレイ機器を制御する請求項8記載の情報提示装置。

【請求項13】

前記タイムライン・ユーザインタフェースは、前記重要度に応じた時間区間の長さを有する表示領域を表示するよう前記ディスプレイ機器を制御し、該表示領域は前記第1の見出し情報の選択操作に用いられる請求項8記載の情報提示装置。

【請求項14】

前記タイムライン・インタフェースは、前記第1の見出し情報と前記第2の見出し情報とを関連付けて表示するよう前記ディスプレイ機器を制御する請求項13記載の情報提示装置。

【請求項15】

前記ディスプレイ機器は電子ホワイトボードを含む請求項8記載の情報提示装置。

【請求項16】

ディスプレイ機器によるプレゼンテーション情報の表示中に、入力デバイスを通じて取得される外部データを記録する手順と、

前記外部データから特徴量を求める手順と、

前記プレゼンテーション情報の表示期間における一定の区間ごとに、前記特徴量を積算することにより重要度を算出する手順と、

予め定められた閾値を超える重要度を有する区間に対応するプレゼンテーション情報の一部分の第1の見出し情報を生成する手順と、

生成された第1の見出し情報を時間軸に沿って並べて前記ディスプレイ機器に表示する手順と、

前記第1の見出し情報に対する前記入力デバイスを用いた選択操作に応じて、前記プレゼンテーション情報の過去の提示内容を検索する手順と、

検索された提示内容を前記ディスプレイ機器に表示する手順と、

前記選択操作がなされた区間に対応するプレゼンテーション情報の一部分の第2の見出し情報を生成する手順と、

前記時間軸に沿って並べられた第1の見出し情報に前記生成された第2の見出し情報を加えて、前記ディスプレイ機器に提示する手順とをコンピュータに実行させるための情報

提示プログラム。

【発明の詳細な説明】

【技術分野】

【0001】

本発明は、ディスプレイ機器に表示されたプレゼンテーション映像、表示中のデータの場所を示す情報、表示中の映像に対して行った操作情報及び周囲の音声・画像情報等から見出し情報を生成して提示し、過去に提示された情報等に容易にアクセスすることのできる情報提示装置に関する。

【背景技術】

【0002】

会議や授業などにおいて、ディスプレイ機器や電子ホワイトボードが活用されている。これは、プロジェクターやパーソナルコンピュータのモニターなどを用いてプレゼンテーションデータを投影して説明や議論に用いられるもので、また電子ホワイトボードの場合はペンや指先の位置を検出することでプレゼンテーション情報に対する書き込みも行えるものである。

【0003】

このような活動において、以前参照した資料や書き込んだ内容を再び参照したいという場合がたびたびあるが、その場合、大抵は保存している場所を探して表示したり、資料の所有者が持つパーソナルコンピュータとディスプレイ機器を接続し直して表示したり、あるいは書き込みが失われて表示されない、ということがあり、以前提示されていた内容を再び提示するためには大きな人的、時間的コストがかかる。

【0004】

このようなコストの解消のために、会議あるいは授業の様子を全て記録し、検索ユーザインタフェースを提供することで再び提示する方法が提案されている。例えば、下記特許文献1には、アノテーションを用いた活性度の付与と要約生成への活用について記載されている。

【0005】

下記特許文献2には、音声、画像、センサ情報の特徴量を可視化して会議データを検索することが記載されている。

【0006】

下記特許文献3及び4には、議事録を時間に沿って提示し、過去の議事内容を議事録に沿って振り返ることが記載されている。

【特許文献1】特開2004-199408号公報

【特許文献2】特開2004-173058号公報

【特許文献3】特開平7-182365号公報

【特許文献4】米国特許第5,572,728号明細書

【発明の開示】

【発明が解決しようとする課題】

【0007】

会議が行われている最中において、発表者がその会議で既になされた重要な議事の内容に振り返りつつ、会議を進行させる場合がしばしばある。このとき、資料等のプレゼンテーションデータの提示操作を行う発表者は、そのような重要な議事内容に対応する、既に提示されたプレゼンテーションデータを容易に呼び出して再度提示できることが好ましい。

【0008】

そして、例えば発表者が既になされた議事内容を振り返って会議を進行したこと自体が、重要な議事内容として記録され、これに応じて検索インタフェースにおいて提示される見出し情報（議事録）等が会議進行中に更新されることが好ましい。しかしながら、このような即時性を備えた検索インタフェースはこれまでに提供されていない。

【0009】

したがって、本発明は、プレゼンテーション中に検索インタフェースにおける表示情報の重要度を更新し、過去の情報提示内容を振り返って提示することのできる情報提示方法、情報提示装置及び情報提示プログラムを提供することを目的とする。

【課題を解決するための手段】

【0010】

本発明の一観点に係る情報提示方法は、ディスプレイ機器によるプレゼンテーション情報の表示中に、入力デバイスを通じて取得される外部データを記録するステップと、前記外部データから特徴量を求めるステップと、前記プレゼンテーション情報の表示期間における一定の区間ごとに、前記特徴量を積算することにより重要度を算出するステップと、予め定められた閾値を超える重要度を有する区間に対応するプレゼンテーション情報の一部分の第1の見出し情報を生成するステップと、生成された第1の見出し情報を時間軸に沿って並べて前記ディスプレイ機器に提示するステップと、前記第1の見出し情報に対する前記入力デバイスを用いた選択操作に応じて、前記プレゼンテーション情報の過去の表示内容を検索するステップと、検索された過去の表示内容を前記ディスプレイ機器に表示するステップと、前記選択操作がなされた区間に対応するプレゼンテーション情報の一部分の第2の見出し情報を生成するステップと、前記時間軸に沿って並べられた第1の見出し情報に前記生成された第2の見出し情報を加えて、前記ディスプレイ機器に提示するステップとを具備する。

【発明の効果】

【0011】

本発明によれば、プレゼンテーション中に検索インタフェースにおける表示情報の重要度を更新することができ、そのような更新後の検索インタフェースにおける表示情報に基づいて過去の情報提示内容を振り返って提示することのできる情報提示方法、情報提示装置及び情報提示プログラムを提供できる。したがって、会議中の情報提示や検索にかかる作業時間を短くし、本質的なディスカッションに割く時間を長くすることが可能となる。

【発明を実施するための最良の形態】

【0012】

以下、図面を参照しながら本発明の実施形態を説明する。

【0013】

本発明の実施形態は、会議中の書き込み、資料参照、音声などの特徴量を求めて記録し、それら特徴量から会議のある場面における重要度を算出し、会議中の代表的な場面を表す見出し情報を生成する手段を設けることで、過去の会議中の任意の場面を容易に取り出すことができるようにしたものである。本発明の実施形態は、CPUなどの制御装置と、ROMやRAMなどの記憶装置と、HDDなどの外部記憶装置と、ディスプレイ装置などの表示装置と、キーボード、マウスなどの入力装置とを備えた一般的なコンピュータを用いて実現することができる。

【0014】

図1は、本発明の一実施形態に係る会議支援システムを示す概要図である。図1に示すように、会議支援システムは、ミーティングサーバ1、電子ホワイトボード2、資料ストレージ4、会議ログストレージ5、ペン6、マイク7、カメラ8などから構成される。

【0015】

ミーティングサーバ1には電子ホワイトボード2が接続されており、資料ストレージ4から会議で用いられる資料ファイルを読み出して電子ホワイトボード2に送信する。資料ストレージ4に格納される資料ファイルは、例えばマイクロソフト社のPowerPoint（登録商標）やExcel（登録商標）などの電子ファイルである。

【0016】

ペン6は、例えば会議における発表者H1が電子ホワイトボード2の表示画面上で位置指定を行ったり、線画や文字等の描画を行うための入力デバイスである。

【0017】

マイク7は、例えば会議の参加者H2の発言を記録する。カメラ8は、会議の様子を映

像として記録するために設けられる。マイク7及びカメラ8からの入力及び電子ホワイトボード2へのペン6を用いた入力、資料の提示、編集、電子ホワイトボード2の画面及び画面切り替えなどは、ミーティングサーバ1において集中管理され、該ミーティングサーバ1に接続された会議ログストレージ5に記録される。

【0018】

電子ホワイトボード2では、会議ログストレージ5に記録されたデータを会議の最中に電子ホワイトボード2上にいつでも呼び出すことができ、このため、スライド操作により過去の記録を呼び出すためのタイムライン・ユーザインタフェース（以下、「タイムライン」という）3を備える。

【0019】

会議ログストレージ5は、ペン6などの入力を「特微量」と呼ばれる値に変換し、一定の時間帯における特微量を時間情報とともに記録する。図2は記録される特微量を図示したものである。ある一定時間において発生した特微量F1の値を時間軸に沿って記録する。特微量F1にはいくつかの種類があり、その種類ごとに分類して記録される。図3は特微量の種類の一例である。例えば、「ペン」の特微量は「描画量」であり、「マイク」の特微量は「音量」、「カメラ」の特微量は「映像変化量」、「資料」の特微量は「切り替え、表示時間、参照回数」、「ホワイトボード」の特微量は「切り替え、表示時間、参照回数」、「タイムライン」の特微量は「参照回数」であったりする。

【0020】

ペン6を用いた入力に基づく特微量は、ペン6がその一定時間内にどの程度の描画を行ったかが特微量として利用される。描画を行った量は、ペン6によって描かれたベクトルデータの長さの合計などで計測される。ペンの太さや色などによって特微量を変更しても良い。

【0021】

マイク7を用いた入力に基づく特微量は、マイク7に入力された音声の音量の総計が用いられる。マイク7が複数ある場合は、それらマイク7の音量の合計を用いる。この特微量は、会議中の議論などによって多くの発言がなされた場面で多くなる。特微量として一定の音量を越えた入力が見られた時間を用いても良い。

【0022】

カメラ8を用いた入力に基づく特微量は、フレーム間の画像の変化量を用いる。画像の変化量は、参加者H2がなんらかのジェスチャーを行ったときや、電子ホワイトボード2上の資料の切り替えや資料への書き込みなどを行ったときに多くなる。

【0023】

ミーティングサーバ1を介した、電子ホワイトボード2上に表示される資料に対する操作も特微量として用いられる。具体的には、スライドのページの切り替えというイベントの発生に一定の特微量を付加したり、あるひとつのスライドがどれだけの時間にわたって電子ホワイトボード2上に表示されていたかを示す表示時間、そのスライドが会議中で何回表示されたか、又は編集されたかを示す参照回数を特微量として用いたり、という動作を行う。これら複数の特微量は、単純に合算して、資料に関する特微量として扱っても良いし、別々の特微量として扱っても良い。

【0024】

電子ホワイトボード2の操作も、資料に関する特徴と同様に、そのページの切り替え操作、ページの表示時間、参照時間などを特微量として用いる。

【0025】

電子ホワイトボード2上のタイムライン3を用いて、会議ログに蓄積された過去の会議を参照することができるが、それによってある時間帯の会議ログを参照した、その参照回数を特微量として用いる。タイムライン3は、スライドだけ表示する場合、見出しに対応する文字列を表示する場合、見出しを表すサムネイル画像を表示する場合、必要に応じていずれの表示形式にも切り替えることができる。また、タイムライン3の方向は必要に応じて縦横、上下いずれにも切り替えることができる。



【0026】

これら記録された特徴量は、会議のどの部分が参加者H2にとって重要であるかの判別に用いられる。

【0027】

図4は、図1に示されるミーティングサーバ1、資料ストレージ4、及び会議ログストレージ5に基づいて構成される会議資料記録提示装置の機能ブロック図である。同図に示すように、会議資料記録提示装置は、映像表示装置100、プレゼンテーションデータ入力部101、外部データ入力部102、データ制御部103、重要度算出部104、見出し情報生成部105、見出し情報選択部106、見出し情報格納部107、プレゼンテーションデータ格納部108、および外部データ格納部109から構成される。

【0028】

見出し情報格納部107、プレゼンテーションデータ格納部108、外部データ格納部109は、HDD、光ディスク、メモ리카ード、RAMなどの一般的に利用されているあらゆる記憶手段により構成することができる。

【0029】

以下に、各機能ブロックの説明を行う。それぞれの機能ブロックを構成するデータ構造及び処理の手順については後述する。

【0030】

映像表示装置100は、ビデオプロジェクタや電子ホワイトボード2、パーソナルコンピュータの画面などのディスプレイ装置であり、プレゼンテーションデータやタイムライン3を電子ホワイトボード2上に表示する。プレゼンテーションデータ入力部101は、映像表示装置100に投影すべきデータの映像信号及びデータのファイル属性を入力として受け付ける。外部データ入力部102は、上記のベン6からの入力や音声情報など映像投影とともに記録されるデータを受け付ける入力部である。データ制御部103は、プレゼンテーションデータ入力部101と外部データ入力部102から得られたデータを時間情報に基づいて統合し、プレゼンテーションデータ格納部108、外部データ格納部109に格納するとともに、映像表示装置100に投影すべき映像データを出力する。また、見出し情報格納部107から見出し情報を読み出し、タイムライン3とあわせて電子ホワイトボード2上に表示する機能を提供する。重要度算出部104は、データ制御部103よりプレゼンテーションデータと外部データを取得し、投影された映像データに対して重要度を算出し、重要度に応じて映像を所定の区間に分割する。見出し情報生成部105は、重要度算出部104で得られた重要度の高い区間に対して、タイムライン3上に表示する見出し情報を生成する。見出し情報選択部106は、映像表示装置100上に表示されたタイムライン3で選択された見出しに対応する表示データをデータ制御部103より読み出し、映像表示装置100上に表示する。見出し情報選択部106で選択された見出し情報に対応する映像区間の重要度は重要度算出部104において更新される。見出し情報格納部107は、見出し情報生成部105によって生成された見出し情報を格納する。プレゼンテーションデータ格納部108は、プレゼンテーションデータの映像及びデータのファイル属性や参照先などの情報を格納する。外部データ格納部109は、プレゼンテーションデータ提示中に記録された上記の各特徴量を格納する。

【0031】

以上のように構成された本実施形態の動作を説明する。

【0032】

図5は、会議ログストレージ5に特徴量を記録する場合の処理手順を示すフローチャートである。会議の開始（ステップS101）とともに、特徴量の記録を開始する。まず会議ログストレージ5に会議情報を記録する（ステップS102）。会議情報には、電子ホワイトボード2上に表示される画像情報や、カメラ8からの会議の様子を記録した動画、マイク7から取得した音声などが含まれる。同時に、図3に示される特徴量を計算し、種別ごとに記録する（ステップS103）。会議情報や特徴量には時間情報が付加されて記録される。以上の記録動作を会議終了まで行う（ステップS104）。最終的に、会議を

通じて取得された情報及び特徴量は、全て、ミーティングサーバ1、会議ログストレージ5、資料ストレージ4のいずれかに格納される。

【0033】

図6に、会議ログストレージ5に格納されるイベントの例を示す。電子ホワイトボード2上の画像表示や、音声発話、ペン6からの入力などの特徴量60が、タイムスタンプ61とともに格納される。

【0034】

図7は、記録された会議情報及び特徴量を用いてタイムライン3が見出し情報生成を含む処理を行う手順を示すフローチャートである。尚、この処理は図5の会議記録動作と並行に行われる。

【0035】

まず、複数の種別の特徴量から、各場面における重要度を算出するための、重要度算出比率を設定する(ステップS201)。重要度算出比率は、複数種類の特徴量から重要度を算出するためのもので、特徴量のうちの種別を重視して重要度を算出するか、ということを設定する。図8は重要度算出比率の設定に用いられるユーザインタフェースの一例を示す図である。種別ごとの重要度への影響の比率をバー80、81...の長さで表す。ユーザは、例えばバー80とバー81との間のスライダ82を左右にドラッグすることで比率を変化させることができる。

【0036】

次に、タイムライン3においていつからいつまでの時間範囲を表示するかを設定する(ステップS202)。

【0037】

設定された時間範囲から、特徴量や重要度をどの程度の粒度の時間範囲で区切って計算するかを設定する(ステップS203)。以下、この時間範囲をフレームと呼ぶ。

【0038】

次に、各フレームの特徴量及び重要度を算出する(ステップS204)。特徴量はそのフレームに含まれる時間帯の特徴量を合算することで得られる。重要度は図9のように、それら特徴量を重要度算出比率に応じて合算することで得られる。これらの処理は図4における重要度算出部104により行われる。

【0039】

次に、それらフレームから、見出し情報を付加する重要なフレームを算出するための、重要度の閾値を算出する(ステップS205)。閾値は、タイムライン3において表示可能な見出し情報の数と、計算された各フレームの重要度から、算出する閾値を超える重要度を持つフレーム数が表示可能な見出し情報の数以内に収まるように設定される。タイムライン3において表示可能な見出し情報の数は、電子ホワイトボード2上の表示範囲などの制限によって決定される。

【0040】

図10に示すように、閾値T1を算出した後、その閾値T1を越える重要度300を有するフレームに対して見出し情報を付加する(ステップS206)。図11に示すように、そのフレームにおける重要度が特定の特徴量を高い割合で含む場合、その特徴量の種類に対応するアイコンを、特徴アイコンI1、I2として表示しても良い。これらの処理は図4における見出し情報生成部105において行われ、生成された見出し情報は見出し情報格納部107に格納される。

【0041】

図12に、見出し情報の格納例を示す。見出しの開始時刻120とともに、重要度の算出結果に基づく見出し内容121、及び他の見出し情報との対応関係として、当該見出しに関連する見出しの時刻122が格納される。他の見出し情報との対応付けについては後述する。

【0042】

また、図5において特徴量を記録する際に、量を表す値だけでなく、その特徴量に関連

する属性情報を取得しても良い。その場合、図13に示すような、特徴量の各種類に対応する属性を特徴量に付加した情報が、会議ログストレージ5に記録される。

【0043】

ペン6による入力に対しては、例えば発表者H1が操作したペン6が丸や下線などの特定の図形を記述したことをストロークとして認識し、その形の種類や図形が電子ホワイトボード2上のどの範囲をカバーしているかを表す範囲を属性として付加することができる。また文字認識を行うことで、ペン6によってどのような文字が記述されたかの情報を付加することができる。

【0044】

マイク7による入力に対しては、音声認識を行うことで発言内容の文字列を付加することができる。また各参加者H2の前に備わったマイク7の音量から発言者がだれかという情報を付加することができる。

【0045】

カメラ8による入力に対しては、画像認識を行うことで、参加者H2がどのようなジェスチャーを行ったかという情報を付加することができる。ジェスチャー情報には、動き方の種類や電子ホワイトボード2中のどの範囲を指しているかを表す指示範囲が含まれる。

【0046】

資料の提示に対しては、その資料の特定部分を表示するためのスクロールやズーム動作から注目点を判別し、付加することができる。またスライドに対してはそのスライドのタイトルや、全スライド中の何ページ目かという情報を付加することができる。

【0047】

電子ホワイトボード2への操作に対しては、ポインタ機能を使って行われたポイントの範囲を情報として付加することができる。

【0048】

図7に説明を戻す。タイムライン3への見出し情報表示は、図4における見出し情報表示部（映像表示装置100）を用いて行われる（ステップS207）。タイムライン3への操作に対しては、その操作を誰が行ったかという操作者の情報を付加することができる。

【0049】

特徴量に上記のような属性が付加されている場合、ある見出し情報に対応する特徴量の属性に基づいて、図14に示すように、その見出し情報を説明する説明文140を付加することができる。また特定の属性を持つ特徴量に対して、その値を増加させることで、重要な属性を備えたフレームに見出し情報が付加されやすくなるようにしても良いし、図15に示すように、タイムライン3とサムネイル画像150とを対応付けて表示しても良い。

【0050】

尚、重要度は前フレームからの特徴量の変化量に基づいて計算されても良い。閾値を越える連続する複数のフレームをひとまとまりにし、それら複数フレームに対して1つの見出し情報を対応付けても良い。また、図16に示すように、各フレームの重要度に応じて、タイムライン3上に表示される各フレームの長さを変更することで、重要なフレームとそうでないフレームの間での表示粒度を変更しても良い。

【0051】

〔他の見出し情報との対応付け〕

図5の特徴量記録において、ユーザがタイムライン3上のスライドの操作による過去の議事の振り返りをしている場合、過去の議事における特徴量を加味した重要度判定を行うための、過去特徴量を記録する場合の処理を図17のフローチャートに示す。タイムライン3上のスライド操作によって過去の議事の電子ホワイトボード2上への呼び出しを行っている場合（ステップS301）、その過去の議事に対応する時間の特徴量を取得し（ステップS302）、その値を過去特徴量として作業メモリ等に一時的に記録する（ステップS303）。図18に示すように、過去特徴量180と通常のリアルタイムに取得する



特徴量181とを合算した値が、その時点での特徴量となり、重要度の算出に用いられる（ステップS304）。過去特徴量は、その記録の前に一定の係数を積算することで、重要度の算出に影響する重みを、通常の特徴量とは異ならせるとよい。

【0052】

過去の議事に振り返る前の見出し表示内容と、振り返った後の見出し表示内容とは対応付けられる。以前に表示したデータを再度参照し、その参照したデータに情報を追記する例について図19及び図20のフローチャートを用いて説明する。

【0053】

画面201において、「A」という文字が描画された直後に、ユーザが画面202のようにスライド190をスライドさせることで、図4における見出し情報選択部106が呼び出され、スライドされた場所に対応する画像が表示される。画面201では、以前描いた「T」が表示される。この時、新しい見出し情報が生成され、参照された元の見出し情報との対応付けが行われる。画面203のように「T」の上にペン6で追記を行った後、画面204のように再びスライド190を表示させると「A」の記入時に表示されていた領域の下に、もう一つ領域191が追加される。画面202において「T」を参照した時の領域193に対応する、画面204における領域192は例えば網掛けを付加することにより表示態様が変更されて表示される。「T」の直前に描いた「A」を再度編集する場合は画面205のようにスライド190を一つ上の領域194まで上げることで表示される。この画面205の領域194は、画面201における領域195に対応している。

【0054】

図20に示すように、まず直前のイベント内容を取得する（ステップS401）。次に、過去のプレゼンテーション内容への参照かをステップS402において判定する。過去のプレゼンテーション内容への参照であるならば、操作後の表示内容に対して見出しを生成し（ステップS403）、この作成された見出しに対して、参照元の見出しを関連見出しとして登録する（ステップS404）。関連見出しとして参照した見出しに装飾（領域192）をして表示する（ステップS405）。

【0055】

以前に表示したデータを関連付けて表示する方法としては、上述したように装飾して表示する場合の他に、図21に示すように、同じファイルを表示している見出し210や、参照関係にある見出し211を並べて表示することで、関連する見出し情報にすぐにアクセスできるようにしてもよい。

【0056】

以上説明したように、本実施形態によれば、タイムライン3上に重要度に応じた見出し情報を付加することで、タイムライン3上において重要な場面を再び電子ホワイトボード2上に呼び出すことが容易になる。重要度は複数の特徴量から算出され、それら特徴量のうちどの特徴量を重視して見出し情報を付加するかを設定するユーザインタフェースを備えることで、システムを利用するユーザや場面に応じた適切な見出し情報を得ることができる。また見出し情報は、タイムライン3上に表示する時間範囲を変化させた場合でも、表示可能な適切な数に抑えられ、タイムライン3上の時間粒度の変化に対応することが可能である。

【0057】

見出し情報には、特定の特徴から重要と判断されたことを表す特徴アイコンや、その特徴に付加された属性から得られる見出し情報説明文を付加することができ、それによって複数の見出し情報からユーザが必要としている会議中の場面を指定することが容易になる。

【0058】

特徴量に合わせてタイムライン3上のフレームの長さを調整することで、会議中の重要な部分が視覚的に判別できるとともに、タイムライン3上のスライドを用いて過去の会議を参照する場合、重要な場面ほどより細かい粒度で参照することが可能になる。

【0059】

また、過去特徴量を加味した特徴量算出を行い、スライドを用いた振り返りを行った場面の重要度を増加させることによれば、会議中に何度も参照した場面の重要度が増すことになる。これによれば、見出し情報をリアルタイムに更新することができ、会議中に繰り返し注目された場面を更新後の見出し情報表示に基づいて容易に呼び出すことができるようになる。

【0060】

尚、本実施の形態にかかる会議資料記録提示装置で実行される会議資料記録提示プログラムは、インストール可能な形式又は実行可能な形式のファイルでCD-ROM、フロッピー（登録商標）ディスク、CD-R、DVD等のコンピュータで読み取り可能な記録媒体に記録されて提供することができる。

【0061】

また、本実施の形態にかかる会議資料記録提示装置で実行される会議資料記録提示プログラムを、インターネット等のネットワークに接続されたコンピュータ上に格納し、ネットワーク経由でダウンロードさせることにより提供するように構成しても良い。また、本実施の形態にかかる会議資料記録提示で実行される会議資料記録提示プログラムをインターネット等のネットワーク経由で提供又は配布するようにしても良い。

【0062】

また、本実施の形態の会議資料記録提示プログラムを、ROM等に予め組み込んで提供するように構成しても良い。

【0063】

本実施の形態にかかる会議資料記録提示装置で実行される資料提示プログラムは、上述した各部を含むモジュール構成となっており、実際のハードウェアとしてはCPUが上記記憶媒体から会議資料記録提示プログラムを読み出して実行することにより上記各部が主記憶装置上にロードされ、上述した各部が主記憶装置上に生成されるようになっている。

【0064】

なお、本発明は上記実施形態そのままに限定されるものではなく、実施段階ではその要旨を逸脱しない範囲で構成要素を変形して具体化できる。また、上記実施形態に開示されている複数の構成要素の適宜な組み合わせにより、種々の発明を形成できる。例えば、実施形態に示される全構成要素から幾つかの構成要素を削除してもよい。さらに、異なる実施形態にわたる構成要素を適宜組み合わせてもよい。

【図面の簡単な説明】

【0065】

【図1】本発明の一実施形態に係る会議支援システムを示す概要図

【図2】時間に沿った特徴量の記録例を示す図

【図3】特徴量の種類の一例を示す図

【図4】会議資料記録提示装置の機能ブロック図

【図5】会議ログストレージ5に特徴量を記録する場合の処理手順を示すフローチャート

【図6】会議ログストレージ5に格納されるイベントの一例を示す図

【図7】記録された会議情報及び特徴量を用いてタイムライン3が見出し情報生成を含む処理を行う手順を示すフローチャート

【図8】重要度算出比率の設定に用いられるユーザインタフェースの一例を示す図

【図9】特徴量を重要度算出比率に応じて合算することにより重要度を算出する例を示す図

【図10】重要度の閾値比較を示す図

【図11】重要度に寄与する特徴量の種類を表す特徴アイコンの表示例を示す図

【図12】見出し情報の格納例を示す図

【図13】会議ログストレージ5に記録される属性付き特徴量の一例を示す図

【図14】見出し情報を説明する説明文の表示例を示す図

【図15】タイムライン3とサムネイル画像150との対応付け表示例を示す図

【図16】フレームの重要度に応じた表示粒度の変更例を示す図

【図17】過去の議事における特徴量を加味した重要度判定を行うための、過去特徴量を記録する場合の処理手順を示すフローチャート

【図18】過去特徴量180と通常のリアルタイムに取得する特徴量181との合算を示す図

【図19】過去の議事に振り返る前の見出し表示内容と、振り返った後の見出し表示内容とは対応付けを説明するためのフローチャート

【図20】過去の議事に振り返る前の見出し表示内容と、振り返った後の見出し表示内容との対応付け表示例を示す図

【図21】関連する見出し情報の表示例を示す図

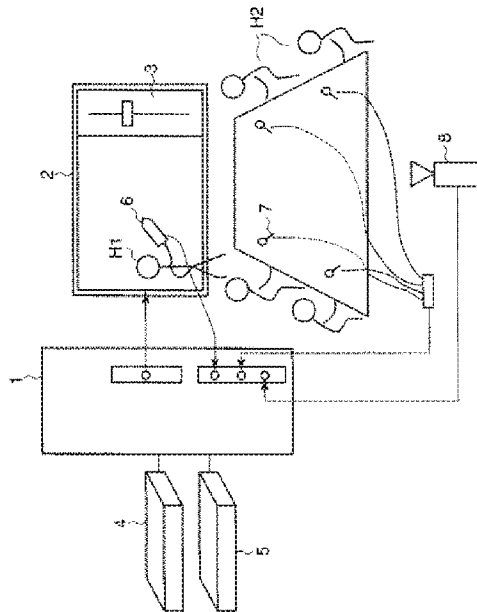
【符号の説明】

【0066】

- 1…ミーティングサーバ；
- 2…電子ホワイトボード；
- 3…タイムライン・ユーザインタフェース；
- 4…資料ストレージ；
- 5…会議ログストレージ；
- 6…ペン；
- 7…マイク；
- 8…カメラ

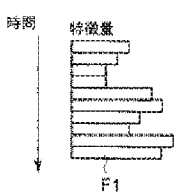
【図1】

図 1



【図2】

図 2



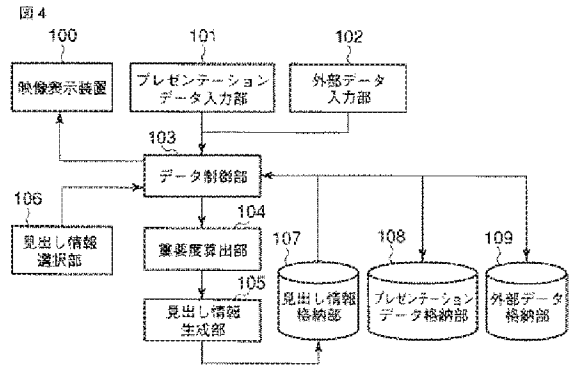
【図3】

図 3

種 類	特 徴 量
ペン	描画量
マイク	音量
カメラ	映像変化量
資料	切り替え、表示時間、参照回数
ホワイトボード	切り替え、表示時間、参照回数
タイムライン	参照回数

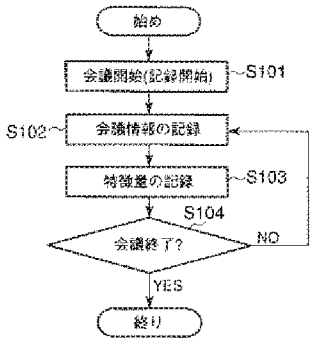
( 1 3 ) 特開2007-148904(P2007-148904A)

【図4】



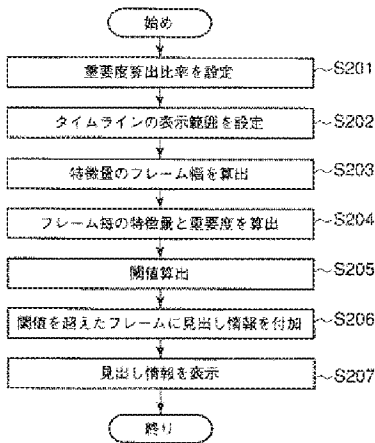
【図5】

図5



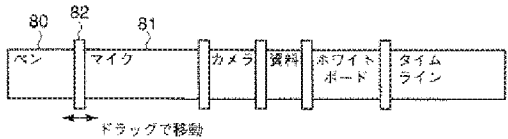
【図7】

図7



【図8】

図8



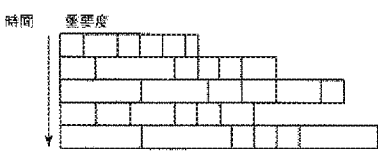
【図6】

図6

時刻	特徴量の種類	内容	属性
2005/10/18 16:29:50	開始	開始	田中
2005/10/18 16:30:10	発言	終了	田中
2005/10/18 16:30:32	スライド操作	スライドショー開始	打ち合わせ資料, ppt, 1ページ
2005/10/18 16:30:42	発言	開始	田中
2005/10/18 16:30:51	発言	終了	田中
2005/10/18 16:30:52	スライド操作	次ページ表示	打ち合わせ資料, ppt, 2ページ
...	...	...	...
2005/10/18 17:03:22	スローワーク	ワーキング	京, (120, 92)
...	...	...	...
2005/10/18 16:30:40	スライダー	見出し情報呼び出し	2005/10/11 10:32:24
...	...	...	...
2005/10/18 17:59:19	スライド操作	スライドショー終了	打ち合わせ資料, ppt

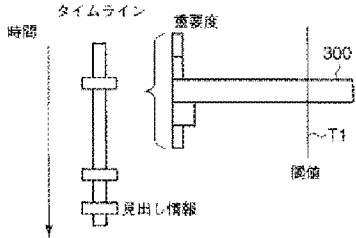
【図9】

図9



【図10】

図10

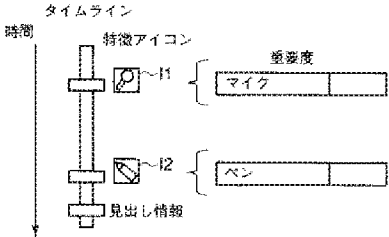


( 1 4 )

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【図11】

図 11



【図13】

図 13

種類	属性付き特徴量
ペン	ストローク(種類、範囲)、文字
マイク	音声認識、発音者
カメラ	ジェスチャー(種類、指示範囲)
資料	注目点(スクロール、ズーム)
ホワイトボード	スライド(タイトル、ページ数)
タイムライン	ポイント(範囲)
	操作者

【図12】

図 12

見出し開始時刻	見出し内容	関連する見出し時刻
2005/10/18 16:29:50	発話	
2005/10/18 16:30:10	アジェンダ表示	
...	...	
2005/10/18 16:33:15	前回議事録参照	
...	...	
2005/10/18 16:30:52	過去内容参照	2005/09/30 14:57:36
...	...	
2005/10/18 17:12:42	スライド参照	2005/10/11 11:23:19
...	...	
2005/10/18 16:32:25	田中さん発話	
...	...	
2005/10/18 17:57:34	TODO表示	

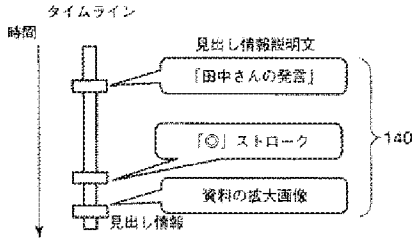
120

121

122

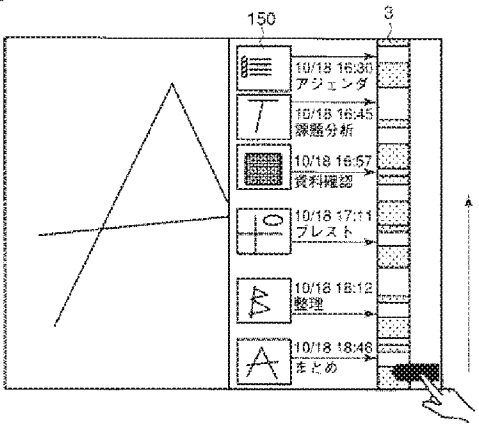
【図14】

図 14



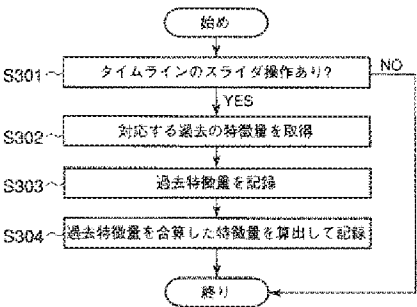
【図15】

図 15



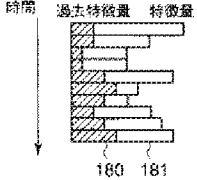
【図17】

図 17



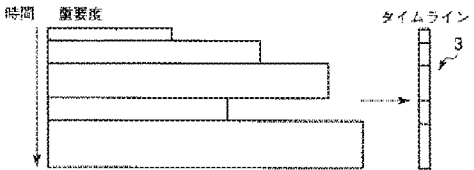
【図18】

図 18



【図16】

図 16

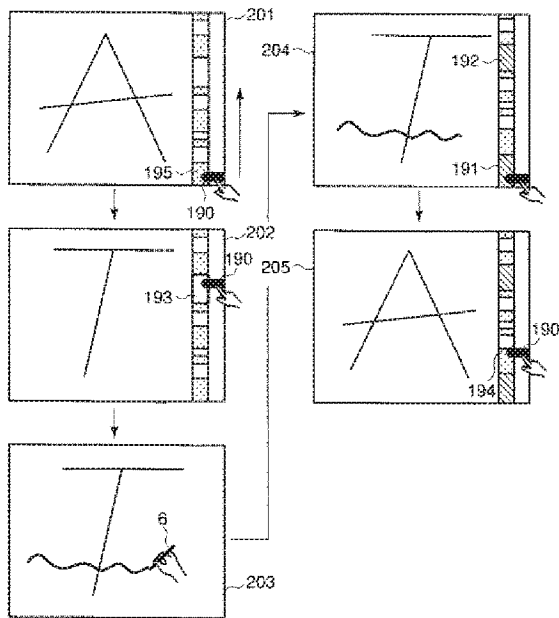


(15)

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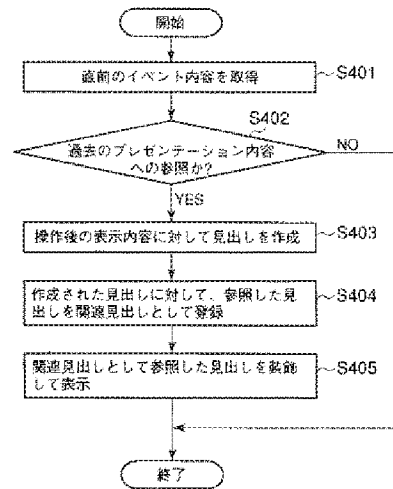
【図19】

図 19



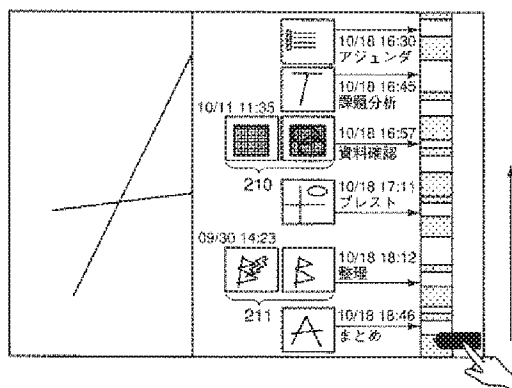
【図20】

図 20



【図21】

図 21



( 1 6 )

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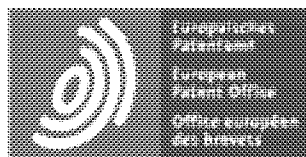
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5B075 NK39 NS10 PP13 PQ02 PQ46 PR08 UU40

**Espacenet**

TW201012222A Method for producing internet video images

Applicants: PRIMAX ELECTRONICS LTD [TW]

Inventors: LYU SZU-HAO [TW]

Classifications:

IPC **H04N7/15;**CPC **H04L12/1827 (EP); H04N21/4143 (EP); H04N21/4223 (EP); H04N21/4312 (EP);  
H04N21/4314 (EP); H04N21/440263 (EP); H04N21/4788 (EP); H04N7/15 (EP);**

Priorities: TW97134980A 2008-09-12

Application: TW201012222A·2008-09-12

Publication: TW201012222A·2010-03-16

Published as: TW201012222A;**US2010066806A1**

Method for producing internet video images

Abstract

The present invention discloses a method for producing internet video images. The method comprises producing a plural of video images by a plural of webcams, compressing the video images into compressed video images and merge the compressed video images into a single conference image and outputting the conference image to plural screens.





(19)中華民國智慧財產局

Page #: 3446

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(22)申請日：中華民國 97 (2008) 年 09 月 12 日

(51)Int. Cl. : **H04N7/15 (2006.01)**

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申請實體審查：有 申請專利範圍項數：19 項 圖式數：2 共 24 頁

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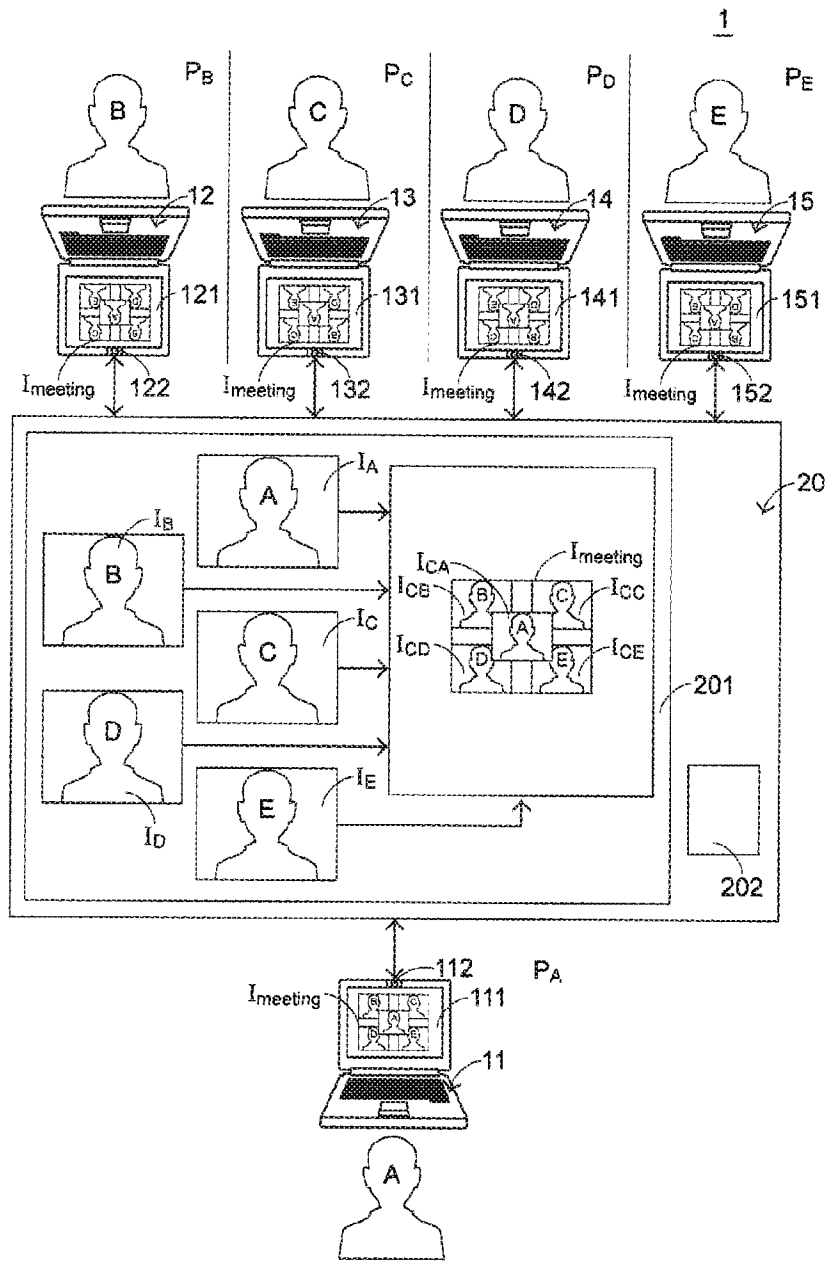
(54)名稱

產生網路視訊影像之方法

METHOD FOR PRODUCING INTERNET VIDEO IMAGES

(57)摘要

本發明係關於一種產生網路視訊影像之方法，包括分別使用複數網路攝影機產生複數影像，壓縮該複數影像並將之結合為一單一會議影像，以及輸出該會議影像至複數螢幕。



1：網路視訊系統  
 11：電腦  
 12：電腦  
 13：電腦  
 14：電腦  
 15：電腦  
 20：網路伺服器  
 111：螢幕  
 112：網路攝影機  
 121：螢幕  
 122：網路攝影機  
 131：螢幕  
 132：網路攝影機  
 141：螢幕  
 142：網路攝影機  
 151：螢幕  
 152：網路攝影機  
 201：記憶體  
 202：視訊影像結合應用程式  
 A：使用者  
 B：使用者  
 C：使用者  
 D：使用者  
 E：使用者  
 I<sub>A</sub>：影像  
 I<sub>B</sub>：影像  
 I<sub>C</sub>：影像  
 I<sub>CA</sub>：影像  
 I<sub>CB</sub>：影像  
 I<sub>CC</sub>：影像  
 I<sub>CD</sub>：影像  
 I<sub>CE</sub>：影像  
 I<sub>D</sub>：影像  
 I<sub>E</sub>：影像  
 I<sub>meeting</sub>：會議影像

P<sub>A</sub>：地點

P<sub>B</sub>：地點

P<sub>C</sub>：地點

P<sub>D</sub>：地點

P<sub>E</sub>：地點

## 六、發明說明：

### 【發明所屬之技術領域】

本發明係關於一種產生網路視訊影像之方法，尤其係關於一種可用於視訊會議之產生網路視訊影像之方法。

### 【先前技術】

傳統的通訊方式包括書信往來、室內電話(公共電話)、傳呼機(又稱扣機或 B.B Call)以及傳真等，但隨著科技的快速發展，電腦以及網際網路隨之發展，使通訊方式也跟著演進。在科技發達的今天，通訊方式已不再限制於傳統書信、電話、簡訊或傳真等方式。例如，書信往返已演化為電子郵件；電話與傳呼機演化為行動電話以及簡訊。

此外，網際網路除了促進電子郵件的發展之外，更提供了一網路通訊平台，是透過網際網路來傳送訊息以達到通訊聯絡的效果，例如部落格或網路通訊程式，而本案係以網路通訊程式為主。網路通訊程式可藉由輸入文字、符號或圖形與在網際網路上的他人進行文字符號上的交談，例如 MSN、即時通以及 Skype 等通訊程式。而該些網路通訊程式更可提供一視訊會議之功能，讓位於不同城市、國家的使用者可透過視訊會議功能來進行會談而可節省長途電話費、國際電話費甚至於可省下原本為了進行當面會談的交通費等。

當使用者利用電腦執行網路通訊程式以進行視訊會議時，電腦的麥克風可錄下使用者的聲音，而電腦的網路攝影機可擷取使用者的影像，並藉由網路通訊程式將使用者的聲音以及影像傳輸至另一使用者的電腦中，再透過另一使用者之電腦的喇叭以及螢幕將該聲音以及影像播放出來。另一使用者亦透過相同方式以傳輸聲音及影像給予使用者，藉此得以進行視訊會議。

上述為兩位使用者進行視訊會議之情況，但當同時有三位使用者欲進行視訊會議時，可分為兩種情形：第一種情形係每個使用者皆位於不同地點；第二種情形則為第一使用者位於一地點，而第二使用者與第三使用者皆位於另一地點。第一種情形的三位使用者進行視訊會議時，以習知網路通訊程式之視訊會議功能僅提供一對一的視訊會議而無法進行一對多的視訊會議，因此，僅可讓第一使用者分別與第二使用者以及第三使用者於不同視窗同時進行視訊會議，而第二使用者與第三使用者則無法進行視訊會議，也就是無法同時進行三方視訊會談。第二種情形則是第二使用者與第三使用者必須透過同一網路攝影機來與第一使用者進行視訊會議，而第二使用者與第三使用者必須擠在網路攝影機之拍攝範圍內才可同時拍攝到第二使用者與第三使用者之影像；若不想擠在網路攝影機之拍攝範圍內的話，必須於需發言的人位於拍攝範圍內，而當另一人發言時則交換位子，如此輪流發言的方式非常不方便且效率低下。

## 【發明內容】

本發明之目的在提供一種可顯示複數影像於同一影像之產生網路視訊影像之方法。

於一較佳實施例中，本發明提供一種產生網路視訊影像之方法，包括：

建立第一電腦、第二電腦以及第三電腦與網路伺服器間之網路連線；

傳輸由第一電腦之第一網路攝影機所拍攝之第一影像、由第二電腦之第二網路攝影機所拍攝之第二影像以及由第三電腦之第三網路攝影機所拍攝之第三影像至網路伺服器；

使用網路伺服器中之視訊影像結合應用程式壓縮結合第一影像、第二影像以及第三影像而產生一會議影像，其中會議影像包括第一被壓縮影像、第二被壓縮影像以及第三被壓縮影像，且第一被壓縮影像、第二被壓縮影像以及第三被壓縮影像可同時顯示於會議影像中；以及

分別輸出會議影像至第一電腦、第二電腦以及第三電腦。

於一較佳實施例中，第一影像、第二影像以及第三影像被儲存於網路伺服器之記憶體中。

於一較佳實施例中，視訊影像結合應用程式將該些影像壓縮結合而產生會議影像，且會議影像被儲存於記憶體中。

於一較佳實施例中，第一電腦、第二電腦以及第三電腦係桌上型電腦或筆記型電腦。

於一較佳實施例中，第一電腦、第二電腦以及第三電腦分別包括第一螢幕、第二螢幕以及第三螢幕，用以展示輸出至第一電腦、第二電腦以及第三電腦之會議影像。

於一較佳實施例中，本發明亦提供一種產生網路視訊影像之方法，包括：

建立第一電腦與第二電腦間之網路連線，其中第二電腦連接於第二網路攝影機以及第三網路攝影機；

傳輸由第一電腦之第一網路攝影機所拍攝之第一影像、由第二網路攝影機所拍攝之第二影像以及由第三網路攝影機所拍攝之第三影像至第二電腦；

使用第二電腦中之視訊影像結合應用程式壓縮結合第一影像、第二影像以及第三影像而產生會議影像，其中會議影像包括第一被壓縮影像、第二被壓縮影像以及第三被壓縮影像，且第一被壓縮影像、第二被壓縮影像以及第三被壓縮影像可同時顯示於會議影像中；以及

分別輸出會議影像至第一電腦以及連接於第二電腦之一螢幕。

於一較佳實施例中，第一影像、第二影像以及第三影像被儲存於第二電腦之記憶體中。

於一較佳實施例中，會議影像被儲存於記憶體中。

於一較佳實施例中，第一電腦以及第二電腦係桌上型電腦或一記型電腦。

於一較佳實施例中，第二電腦更包括複數 USB 連接埠，使第二電腦藉由複數 USB 連接埠連接於第二網路攝影機以及

第三網路攝影機。

於一較佳實施例中，第二電腦更包括一 USB 擴充器，而 USB 擴充器具有複數 USB 連接埠，使第二電腦藉由該 USB 擴充器連接於第二網路攝影機以及第三網路攝影機。

於一較佳實施例中，第一電腦包括第一螢幕，用以展示輸出至第一電腦之會議影像。

於一較佳實施例中，連接於第二電腦之螢幕係一投射布幕，用以展示輸出至第二電腦之會議影像。

於一較佳實施例中，本發明更提供一種產生網路視訊影像之方法，包括：

分別使用第一電腦，第二電腦以及第三電腦產生並輸出第一影像、第二影像以及第三影像；

壓縮第一影像、第二影像以及第三影像並將之結合為一會議影像，其中會議影像包括第一被壓縮影像、第二被壓縮影像以及第三被壓縮影像，且第一被壓縮影像、第二被壓縮影像以及第三被壓縮影像可同時顯示於會議影像中；以及

分別輸出會議影像至第一電腦、第二電腦以及第三電腦。

於一較佳實施例中，第一電腦更包括第一網路攝影機，第二電腦更包括第二網路攝影機，而第三電腦更包括第三網路攝影機，該些網路攝影機分別用以拍攝而產生第一影像、第二影像以及第三影像。

於一較佳實施例中，第一電腦、第二電腦以及第三電腦透過網路輸出第一影像、第二影像以及第三影像至網路伺服器之



記憶體中。

於一較佳實施例中，會議影像被儲存於記憶體中。

於一較佳實施例中，第一電腦、第二電腦以及第三電腦係桌上型電腦或筆記型電腦。

於一較佳實施例中，第一電腦、第二電腦以及第三電腦更各自包括第一螢幕、第二螢幕以及第三螢幕，用以分別展示輸出至第一電腦、第二電腦以及第三電腦之會議影像。

### 【實施方式】

以下藉由實施例來說明本發明之方法，請參閱第一圖，其為本發明產生網路視訊影像之方法於一較佳實施例之方塊示意圖。第一圖中揭露應用於使用者與位於同一地點之多位使用者進行視訊會議之較佳實施例，其中第一使用者 A 位於第一地點  $P_A$ ，而第二使用者 B、第三使用者 C、第四使用者 D 以及第五使用者 E 位於第二地點  $P_B$ ，其中第二地點  $P_B$  係一會議室。網路視訊系統 1 中包括網路伺服器 20、位於第一地點  $P_A$  之第一電腦 11 以及位於第二地點  $P_B$  (即會議室) 之第二電腦 12，其中第二電腦 12 包括一記憶體 201 以及一視訊影像結合應用程式 202，且第二電腦 12 另外連接於一投影布幕 30。為了使位於第二地點  $P_B$  之四位使用者不必擠在攝影機之拍攝範圍內，於每一使用者面前設置一網路攝影機，其中第二網路攝影機 122 用以拍攝第二使用者 B，第三網路攝影機 132 用以拍攝第三使用者 C，第四網路攝影機 142 拍攝第四使用者 D，而第五

網路攝影機 152 拍攝第五使用者 E，且該些網路攝影機 122 至 152 連接於第二電腦 12，其中位於第二地點  $P_B$  之第二電腦 12 係桌上型電腦，而位於第一地點  $P_A$  之第一使用者 A 所使用之第一電腦 11 係包括第一螢幕 111 以及第一網路攝影機 112 之筆記型電腦。

第一圖中，當第一使用者 A 欲與其他四位使用者 B 至 E 進行視訊會議時，使第一電腦 11 透過網際網路連接於第二電腦 12，接下來第一電腦 11 之第一網路攝影機 112 拍攝第一使用者 A 而產生一第一影像  $I_A$ ，而位於第二地點  $P_B$  之第二網路攝影機 122 拍攝第二使用者 B 而產生一第二影像  $I_B$ ，第三網路攝影機 132 拍攝第三使用者 C 而產生一第三影像  $I_C$ ，第四網路攝影機 142 拍攝第四使用者 D 而產生一第四影像  $I_D$ ，而第五網路攝影機 152 拍攝第五使用者 E 而產生一第五影像  $I_E$ 。位於第二地點  $P_B$  之網路攝影機 122 至 152 透過一擴充器 40 連接於第二電腦 12，其中第二網路攝影機 122 連接於擴充器 40 之第一 USB 連接埠 401，第三網路攝影機 132 連接於擴充器 40 之第二 USB 連接埠 402，第四網路攝影機 142 連接於擴充器 40 之第三 USB 連接埠 403，而第五網路攝影機 152 連接於擴充器 40 之第四 USB 連接埠 404。一般而言，網路攝影機可直接連接於電腦之 USB 連接埠即可，於本較佳實施例中另設置一擴充器 40 係由於網路攝影機之數量大於第二電腦 12 之 USB 連接埠。

影像擷取完成後，第一電腦 11 透過網路輸出第一影像  $I_A$  至第二電腦 12 之記憶體 201 儲存，而位於第二地點  $P_B$  之網路

攝影機 122 至 152 透過實體線路將影像  $I_B$  至  $I_E$  傳輸至第二電腦 12 之記憶體 201，於本較佳實施例中，該些影像  $I_A$  至  $I_E$  之解析度係為  $640 \times 480$ 。接下來，第二電腦 12 中之視訊影像結合應用程式 202 壓縮該些影像  $I_A$  至  $I_E$  為第一被壓縮影像  $I_{CA}$ 、第二被壓縮影像  $I_{CB}$ 、第三被壓縮影像  $I_{CC}$ 、第四被壓縮影像  $I_{CD}$  以及第五被壓縮影像  $I_{CE}$ ，其中被壓縮影像  $I_{CA}$  至  $I_{CE}$  之解析度小於  $640 \times 480$ 。此外，視訊影像結合應用程式 202 更將該些被壓縮影像  $I_{CA}$  至  $I_{CE}$  結合為一會議影像  $I_{meeting}$ ，其中會議影像  $I_{meeting}$  包括第一被壓縮影像  $I_{CA}$ 、第二被壓縮影像  $I_{CB}$ 、第三被壓縮影像  $I_{CC}$ 、第四被壓縮影像  $I_{CD}$  以及第五被壓縮影像  $I_{CE}$ ，且第一被壓縮影像  $I_{CA}$ 、第二被壓縮影像  $I_{CB}$ 、第三被壓縮影像  $I_{CC}$ 、第四被壓縮影像  $I_{CD}$  以及第五被壓縮影像  $I_{CE}$  可同時顯示於該會議影像  $I_{meeting}$  中，而會議影像  $I_{meeting}$  之影像解析度亦為  $640 \times 480$ ，會議影像  $I_{meeting}$  之排列方式如第一圖中之所示。

接下來會議影像  $I_{meeting}$  被輸出至第一電腦 11 之第一螢幕 111，而會議影像  $I_{meeting}$  亦被輸出至連接於第二電腦 12 之投影布幕 30，使位於第二地點  $P_B$  之使用者 B 至 E 可同時觀看顯示於投影布幕 30 之會議影像  $I_{meeting}$ ，同樣地，第一使用者 A 亦可透過第一螢幕 111 觀看會議影像  $I_{meeting}$ 。本發明將所有使用者之影像整合於一張會議影像  $I_{meeting}$  上並將其輸出至位於不同地點之螢幕，使每個使用者可看到每個會議參與者之影像，不需如習知技術般交換位子或擠在拍攝範圍內，而可讓複數使用者得以進行兩人以上之視訊會議。

本較佳實施例僅揭露一種會議影像  $I_{meeting}$  之排列形式，如

第一圖所示，但本發明之方法並未限制會議影像  $I_{meeting}$  之排列形式。由上述可知，本發明產生網路視訊影像之方法解決了位於不同地點之使用者無法同時進行視訊會議之困擾。

接下來說明多位使用者位於不同地點進行視訊會議之情況，請參閱第二圖，其為本發明產生網路視訊影像之方法於另一較佳實施例中之方塊示意圖。第二圖揭露了應用於五位使用者位於不同地點之較佳實施例，其中第一使用者 A 位於第一地點  $P_A$ ，第二使用者 B 位於第二地點  $P_B$ ，第三使用者 C 位於第三地點  $P_C$ ，第四使用者 D 位於第四地點  $P_D$ ，而第五使用者 E 位於第五地點  $P_E$ 。網路視訊系統 1 中包括網路伺服器 20、位於第一地點  $P_A$  之第一電腦 11、位於第二地點  $P_B$  之第二電腦 12、位於第三地點  $P_C$  之第三電腦 13、位於第四地點  $P_D$  之第四電腦 14 以及位於第五地點  $P_E$  之第五電腦 15，其中網路伺服器 20 包括一記憶體 201 以及一視訊影像結合應用程式 202。於本較佳實施例中，電腦 11 至 15 皆為內建網路攝影機之筆記型電腦，其中第一電腦 11 包括第一螢幕 111 以及第一網路攝影機 112，第二電腦 12 包括第二螢幕 121 以及第二網路攝影機 122，第三電腦 13 包括第三螢幕 131 以及第三網路攝影機 132，第四電腦 14 包括第四螢幕 141 以及第四網路攝影機 142，第五電腦 15 包括第五螢幕 151 以及第五網路攝影機 152。

第二圖中，當第一使用者 A 欲與其他四位使用者進行視訊會議時，使第一電腦 11 連接上網際網路而建立第一電腦 11 與網路伺服器 20 之網路連線，其他四台電腦 12 至 15 亦透過網際網路連接至網路伺服器 20。第一電腦 11 之第一網路攝影機

112 拍攝第一使用者 A 而產生一第一影像  $I_A$ ，第二電腦 12 之第二網路攝影機 122 拍攝第二使用者 B 而產生一第二影像  $I_B$ ，第三電腦 13 之第三網路攝影機 132 拍攝第三使用者 C 而產生一第三影像  $I_C$ ，第四電腦 14 之第四網路攝影機 142 拍攝第四使用者 D 而產生一第四影像  $I_D$ ，而第五電腦 15 之第五網路攝影機 152 拍攝第五使用者 E 而產生一第五影像  $I_E$ ，於本較佳實施例中，該些影像  $I_A$  至  $I_E$  之解析度係為  $640 \times 480$ 。而該些影像  $I_A$  至  $I_E$  透過網路傳輸至網路伺服器 20 之記憶體 201 儲存，網路伺服器 20 中之視訊影像結合應用程式 202 將該些影像  $I_A$  至  $I_E$  壓縮為解析度  $320 \times 240$  之第一被壓縮影像  $I_{CA}$ 、第二被壓縮影像  $I_{CB}$ 、第三被壓縮影像  $I_{CC}$ 、第四被壓縮影像  $I_{CD}$  以及第五被壓縮影像  $I_{CE}$ ，並將該些被壓縮影像  $I_{CA}$  至  $I_{CE}$  結合為一會議影像  $I_{meeting}$ ，其中會議影像  $I_{meeting}$  包括第一被壓縮影像  $I_{CA}$ 、第二被壓縮影像  $I_{CB}$ 、第三被壓縮影像  $I_{CC}$ 、第四被壓縮影像  $I_{CD}$  以及第五被壓縮影像  $I_{CE}$ ，且第一被壓縮影像  $I_{CA}$ 、第二被壓縮影像  $I_{CB}$ 、第三被壓縮影像  $I_{CC}$ 、第四被壓縮影像  $I_{CD}$  以及第五被壓縮影像  $I_{CE}$  可同時顯示於該會議影像  $I_{meeting}$  中。

接下來會議影像  $I_{meeting}$  被分別輸出至第一電腦 11、第二電腦 12、第三電腦 13、第四電腦 14 以及第五電腦 15，再分別將會議影像  $I_{meeting}$  顯示於第一螢幕 111、第二螢幕 121、第三螢幕 131、第四螢幕 141 以及第五螢幕 151 上，以供電腦前之各使用者觀看，讓每一使用者可看到每個會議參與者之影像，甚至於可看到自己的影像，藉此，讓複數使用者得以進行兩人以上之視訊會議。需特別說明的是，於本較佳實施例中，視訊影

像結合應用程式將影像解析度為  $640 \times 480$  之該些影像  $I_A$  至  $I_E$  壓縮為影像解析度  $320 \times 240$  之該些被壓縮影像  $I_{CA}$  至  $I_{CE}$ ，再將被壓縮之影像結合為會議影像  $I_{meeting}$ ，而會議影像  $I_{meeting}$  之影像解析度亦為  $640 \times 480$ 。本較佳實施例揭露了不同於第一圖之會議影像  $I_{meeting}$  之排列形式，且本發明之方法並未限制視訊影像結合應用程式將影像壓縮為何種解析度之被壓縮影像，唯一限制僅是被壓縮影像之解析度小於未壓縮前之影像，而未壓縮前之影像以及會議影像  $I_{meeting}$  之影像解析度並不限於  $640 \times 480$ 。

由上述二較佳實施例可知，本發明產生網路視訊影像之方法可解決習知技術中使用者無法同時進行一人對多人或多對多視訊會議之困擾，且本發明方法僅需另設計一視訊影像結合應用程式即可直接使用於現有之硬體上，而不需額外耗費研發成本。此外，實施本發明方法雖需龐大的網路頻寬以及記憶體設備，但以現在的電腦技術是可以達成的，更何況電腦科技仍繼續研發中，日後電腦科技更發達、更成熟時，本發明之方法則可更臻完善。

以上所述僅為本發明之較佳實施例，並非用以限定本發明之申請專利範圍，因此凡其它未脫離本發明所揭示之精神下所完成之等效改變或修飾，均應包含於本案之申請專利範圍內。

## 【圖式簡單說明】

第一圖係本發明產生網路視訊影像之方法於一較佳實施例中之方塊示意圖。

第二圖係本發明產生網路視訊影像之方法於另一較佳實施例中之方塊示意圖。

## 【主要元件符號說明】

1 網路視訊系統

11、12、13、14、15 電腦

20 網路伺服器

30 投射布幕

40 擴充器

111、121、131、141、151 螢幕

112、122、132、142、152 網路攝影機

201 記憶體

202 視訊影像結合應用程式

401、402、403、404 USB 連接埠

A、B、C、D、E 使用者

$I_A$ 、 $I_B$ 、 $I_C$ 、 $I_D$ 、 $I_E$  影像

$I_{CA}$ 、 $I_{CB}$ 、 $I_{CC}$ 、 $I_{CD}$ 、 $I_{CE}$  影像

$I_{meeting}$  會議影像

$P_A$ 、 $P_B$ 、 $P_C$ 、 $P_D$ 、 $P_E$  地點



# 發明專利說明書

(本說明書格式、順序，請勿任意更動，※記號部分請勿填寫)

※申請案號：97134980

※申請日：97. 9. 12

※IPC 分類：H04N 7/5 (2006.01)

## 一、發明名稱：(中文/英文)

產生網路視訊影像之方法 / METHOD FOR PRODUCING  
INTERNET VIDEO IMAGES

## 二、中文發明摘要：

本發明係關於一種產生網路視訊影像之方法，包括分別使用複數網路攝影機產生複數影像，壓縮該複數影像並將之結合為一單一會議影像，以及輸出該會議影像至複數螢幕。

## 三、英文發明摘要：

The present invention discloses a method for producing internet video images. The method comprises producing a plural of video images by a plural of webcams, compressing the video images into compressed video images and merge the compressed video images into a single conference image and outputting the conference image to plural screens.



## 七、申請專利範圍：

### 1、一種產生網路視訊影像之方法，包括：

建立一第一電腦、一第二電腦以及一第三電腦與一網路伺服器間之網路連線；

傳輸由該第一電腦之一第一網路攝影機所拍攝之一第一影像、由該第二電腦之一第二網路攝影機所拍攝之一第二影像以及由該第三電腦之一第三網路攝影機所拍攝之一第三影像至該網路伺服器；

使用該網路伺服器中之一視訊影像結合應用程式壓縮結合該第一影像、該第二影像以及該第三影像而產生一會議影像，其中該會議影像包括一第一被壓縮影像、一第二被壓縮影像以及一第三被壓縮影像，且該第一被壓縮影像、該第二被壓縮影像以及該第三被壓縮影像可同時顯示於該會議影像中；以及

分別輸出該會議影像至該第一電腦、該第二電腦以及該第三電腦。

2、如申請專利範圍第 1 項所述之產生網路視訊影像之方法，其中該第一影像、該第二影像以及該第三影像被儲存於該網路伺服器之一記憶體中。

3、如申請專利範圍第 2 項所述之產生網路視訊影像之方法，其中該視訊影像結合應用程式將該些影像壓縮結合而產生該會議影像，且該會議影像被儲存於該記憶體中。

4、如申請專利範圍第 1 項所述之產生網路視訊影像之方法，其中該第一電腦、該第二電腦以及該第三電腦係一桌上型電腦或一

筆記型電腦。

5、如申請專利範圍第 1 項所述之產生網路視訊影像之方法，其中該第一電腦、該第二電腦以及該第三電腦分別包括一第一螢幕、一第二螢幕以及一第三螢幕，用以展示輸出至該第一電腦、該第二電腦以及該第三電腦之該會議影像。

6、一種產生網路視訊影像之方法，包括：

建立一第一電腦與一第二電腦間之網路連線，其中該第二電腦連接於一第二網路攝影機以及一第三網路攝影機；

傳輸由該第一電腦之一第一網路攝影機所拍攝之一第一影像、由該第二網路攝影機所拍攝之一第二影像以及由該第三網路攝影機所拍攝之一第三影像至該第二電腦；

使用該第二電腦中之一視訊影像結合應用程式壓縮結合該第一影像、第二影像以及該第三影像而產生一會議影像，其中該會議影像包括一第一被壓縮影像、一第二被壓縮影像以及一第三被壓縮影像，且該第一被壓縮影像、該第二被壓縮影像以及該第三被壓縮影像可同時顯示於該會議影像中；以及

分別輸出該會議影像至該第一電腦以及連接於該第二電腦之一螢幕。

7、如申請專利範圍第 6 項所述之產生網路視訊影像之方法，其中該第一影像、該第二影像以及該第三影像被儲存於該第二電腦之一記憶體中。

8、如申請專利範圍第 7 項所述之產生網路視訊影像之方法，其中該會議影像被儲存於該記憶體中。

9、如申請專利範圍第 6 項所述之產生網路視訊影像之方法，其

中該第一電腦以及該第二電腦係一桌上型電腦或一筆記型電腦。

10、如申請專利範圍第 6 項所述之產生網路視訊影像之方法，其中該第二電腦更包括複數 USB 連接埠，使該第二電腦藉由該複數 USB 連接埠連接於該第二網路攝影機以及該第三網路攝影機。

11、如申請專利範圍第 6 項所述之產生網路視訊影像之方法，其中該第二電腦更包括一 USB 擴充器，而該 USB 擴充器具有複數 USB 連接埠，使該第二電腦藉由該 USB 擴充器連接於該第二網路攝影機以及該第三網路攝影機。

12、如申請專利範圍第 6 項所述之產生網路視訊影像之方法，其中該第一電腦包括一第一螢幕，用以展示輸出至該第一電腦之該會議影像。

13、如申請專利範圍第 6 項所述之產生網路視訊影像之方法，其中連接於該第二電腦之該螢幕係一投射布幕，用以展示輸出至該第二電腦之該會議影像。

14、一種產生網路視訊影像之方法，包括：

分別使用一第一電腦，一第二電腦以及一第三電腦產生並輸出一第一影像、一第二影像以及一第三影像；

壓縮該第一影像、該第二影像以及該第三影像並將之結合為一會議影像，其中該會議影像包括一第一被壓縮影像、一第二被壓縮影像以及一第三被壓縮影像，且該第一被壓縮影像、該第二被壓縮影像以及該第三被壓縮影像可同時顯示於該會議影像中；以及

分別輸出該會議影像至該第一電腦、該第二電腦以及該第三電腦。

15、如申請專利範圍第 14 項所述之產生網路視訊影像之方法，其中該第一電腦更包括一第一網路攝影機，該第二電腦更包括一第二網路攝影機，而該第三電腦更包括一第三網路攝影機，該些網路攝影機分別用以拍攝而產生該第一影像、該第二影像以及該第三影像。

16、如申請專利範圍第 14 項所述之產生網路視訊影像之方法，其中該第一電腦、該第二電腦以及該第三電腦透過網路輸出該第一影像、該第二影像以及該第三影像至一網路伺服器之一記憶體中。

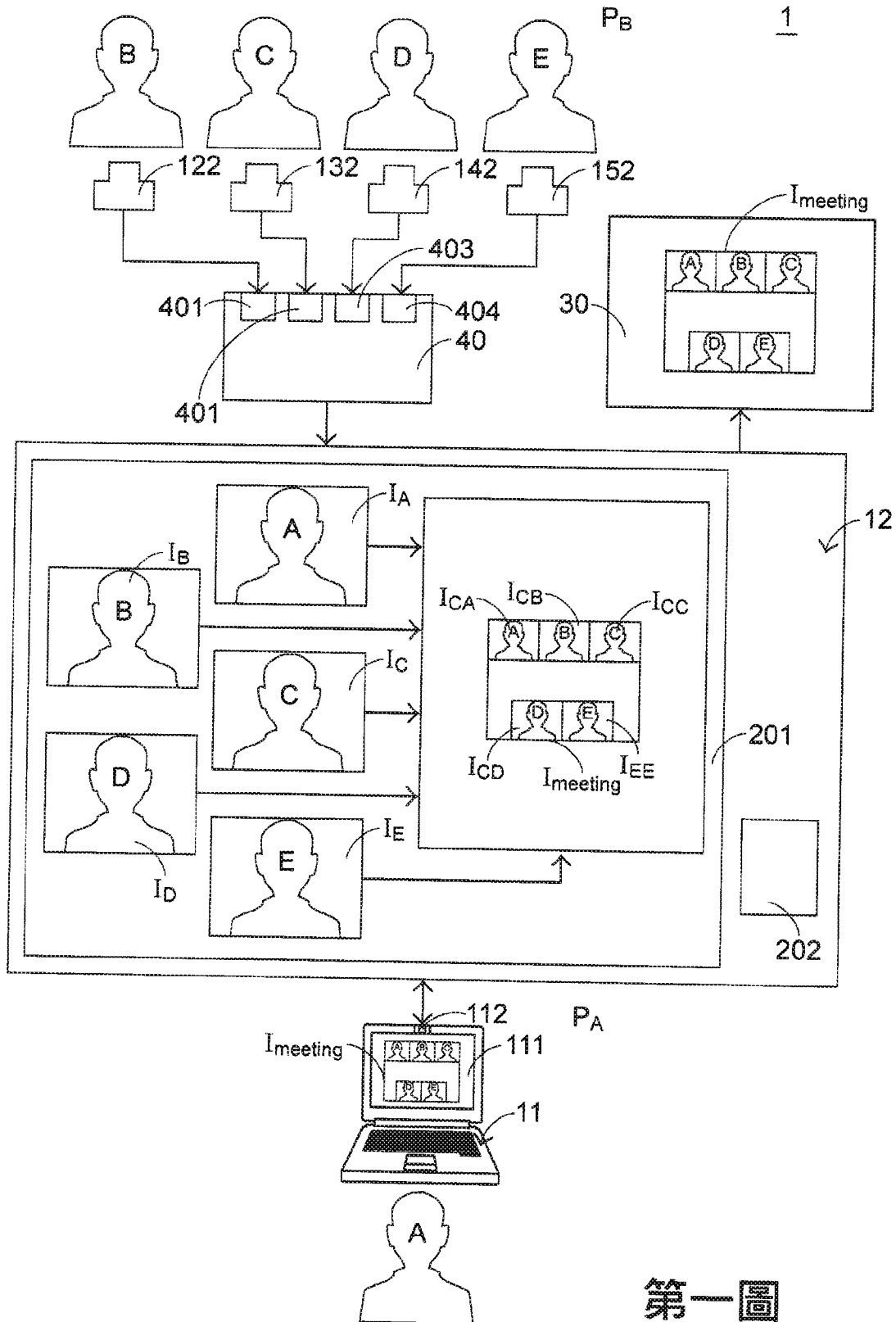
17、如申請專利範圍第 16 項所述之產生網路視訊影像之方法，其中該會議影像被儲存於該記憶體中。

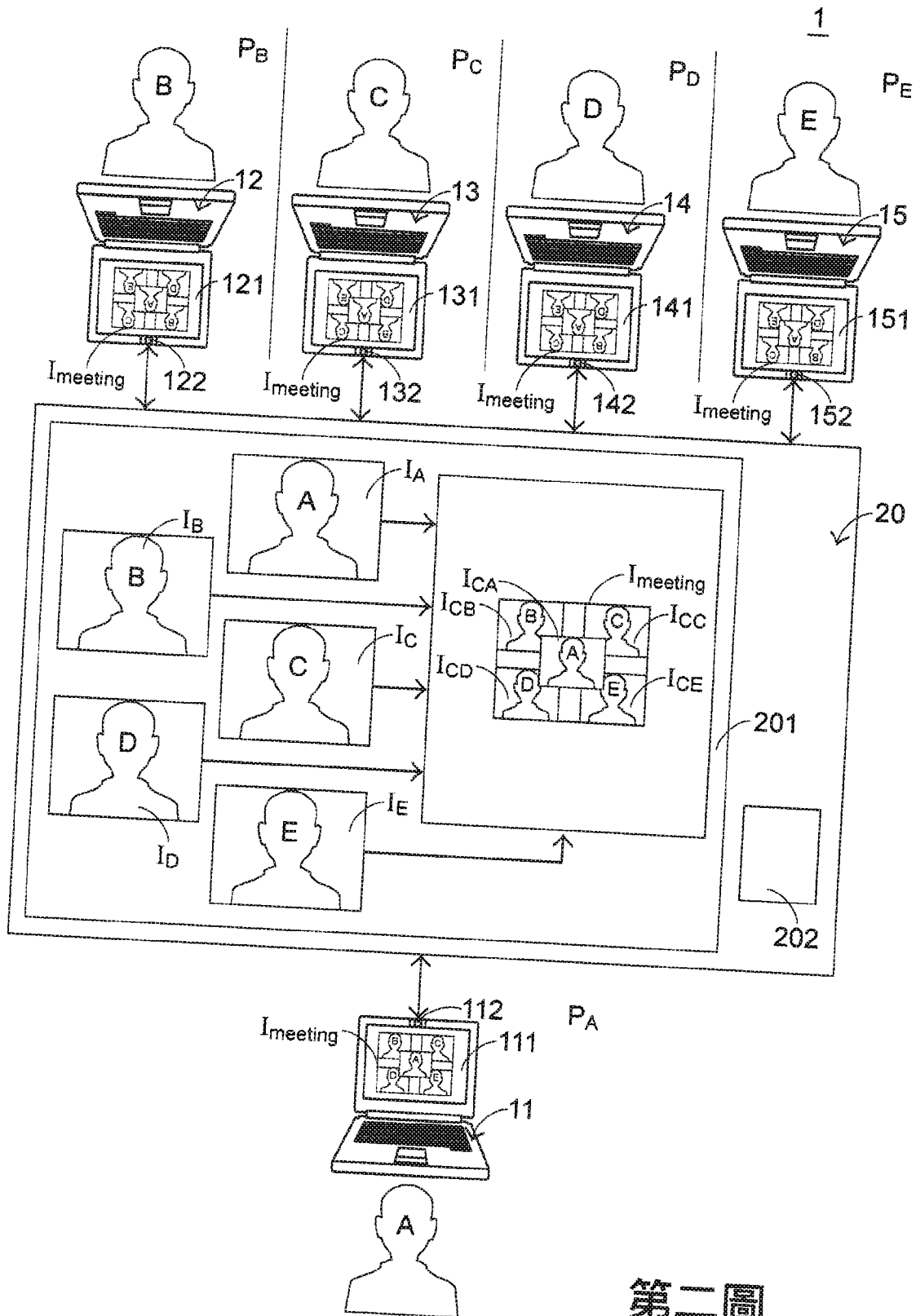
18、如申請專利範圍第 14 項所述之產生網路視訊影像之方法，其中該第一電腦、該第二電腦以及該第三電腦係一桌上型電腦或一筆記型電腦。

19、如申請專利範圍第 14 項所述之產生網路視訊影像之方法，其中該第一電腦、該第二電腦以及該第三電腦更各自包括一第一螢幕、一第二螢幕以及一第三螢幕，用以分別展示輸出至該第一電腦、該第二電腦以及該第三電腦之該會議影像。

八、圖式：







第二圖

#### 四、指定代表圖：

(一)本案指定代表圖為：第（ 二 ）圖。

(二)本代表圖之元件符號簡單說明：

1 網路視訊系統

11、12、13、14、15 電腦

20 網路伺服器

111、121、131、141、151 螢幕

112、122、132、142、152 網路攝影機

201 記憶體

202 視訊影像結合應用程式

A、B、C、D、E 使用者

I<sub>A</sub>、I<sub>B</sub>、I<sub>C</sub>、I<sub>D</sub>、I<sub>E</sub> 影像

I<sub>CA</sub>、I<sub>CB</sub>、I<sub>CC</sub>、I<sub>CD</sub>、I<sub>CE</sub> 影像

I<sub>meeting</sub> 會議影像

P<sub>A</sub>、P<sub>B</sub>、P<sub>C</sub>、P<sub>D</sub>、P<sub>E</sub> 地點

#### 五、本案若有化學式時，請揭示最能顯示發明特徵的化學式：

無



**Electronic Acknowledgement Receipt**

<b>EFS ID:</b>	40210088
<b>Application Number:</b>	16852790
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5321
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas Lee/Shelly Darrenkamp
<b>Filer Authorized By:</b>	Thomas Lee
<b>Attorney Docket Number:</b>	BEEL3004C/TL
<b>Receipt Date:</b>	06-AUG-2020
<b>Filing Date:</b>	20-APR-2020
<b>Time Stamp:</b>	11:50:20
<b>Application Type:</b>	Utility under 35 USC 111(a)

**Payment information:**

Submitted with Payment	no
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**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	BEEL3004C_IDS.pdf	1035131 4573518531ecba546ad9e31f8a591cca29cd9f48	no	5

**Warnings:**

Case 2:23-cv-00521-JRG-RSP Document 71-10 Filed 01/28/25 Page 356 of 1328

PageID #: 3471

Information:					
2	Non Patent Literature	BAR4249CN_OA1_with_translation_7Apr2020.pdf	1296492	no	15
			85c1eb78fbc4c52b6a78bec82e0468e7921a30f0		
Warnings:					
Information:					
3	Non Patent Literature	BAR4591CN_OA1_with_translation_7Apr2020.pdf	1164690	no	13
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4	Foreign Reference	CN1525300_with_abstract.pdf	4092578	no	43
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Warnings:					
Information:					
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Warnings:					
Information:					
6	Foreign Reference	CN101046952_with_abstract.pdf	3605502	no	34
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Warnings:					
Information:					
7	Foreign Reference	CN101075896_with_abstract.pdf	2335257	no	21
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Information:					
8	Foreign Reference	CN102025774_with_abstract.pdf	571619	no	8
			f547db7aa62cbdd7468ec9871f3dea741a6ff6f2f		
Warnings:					
Information:					

9	Foreign Reference	CN102088593_with_translation.pdf	2532469 af856d26d253c6fec0dcbe3ea607024ad038cde6	no	29
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**Warnings:****Information:**

10	Foreign Reference	JP2007148904_with_abstract.pdf	904818 13a961fc9bab366adb6df2283884a7094de27eae	no	17
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**Warnings:****Information:**

11	Foreign Reference	TW201012222_with_abstract.pdf	1892810 a2140b441fe6e084e4ee1282a394a877e9eab38b	no	25
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**Warnings:****Information:**

Total Files Size (in bytes):			21065626		
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**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/852,790	04/20/2020	Koen Simon Herman Beel	BEEL3004C/TL	5321
23364	7590	10/08/2020		
BACON & THOMAS, PLLC 625 SLATERS LANE FOURTH FLOOR ALEXANDRIA, VA 22314-1176			EXAMINER BARTELS, CHRISTOPHER A.	
			ART UNIT	PAPER NUMBER
			2184	
			NOTIFICATION DATE	DELIVERY MODE
			10/08/2020	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

MAIL@BACONTHOMAS.COM

**Office Action Summary**Application No.  
16/852,790Applicant(s)  
Beel et al.Examiner  
CHRISTOPHER A BARTELSArt Unit  
2184AIA (FITF) Status  
No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on \_\_\_\_\_.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims\***

- 5) ☒ Claim(s) 1-100 is/are pending in the application.  
5a) Of the above claim(s) 1-81 is/are withdrawn from consideration.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 7) ☒ Claim(s) 82-100 is/are rejected.
- 8) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 9) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement

\* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

**Application Papers**

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☒ The drawing(s) filed on 04/20/2020 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

- a) ☐ All b) ☐ Some\*\* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)  
Paper No(s)/Mail Date See Continuation Sheet
- 3) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Other: \_\_\_\_\_

Continuation of Attachment(s) 2) Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)  
Paper No(s)/Mail Date: 04/20/2020, 04/20/2020, 06/16/2020, 06/30/2020, 08/06/2020,

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***Notice of Pre-AIA or AIA Status***

1. The present application is being examined under the pre-AIA first to invent provisions.

***Information Disclosure Statement***

2. The information disclosure statement (IDS) submitted on 04/20/2020, 04/20/2020, 06/16/2020, 06/30/2020, and 08/06/2020 was filed. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

***Claim Rejections - 35 USC § 103***

5. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

6. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this

Office action:

(a) A patent may not be obtained through the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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7. Claim 82-85, 87-95, and 97-100 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Nuyttens et al. (USPGPUB No. 2007/0033289 A1, hereinafter referred to as Nuyttens) in view of Thompson (USPGPUB No. 2009/0247006 A1).

*Referring to claim 82, Nuyttens discloses a method for connecting a processing device {CPU mezzanine board 47, see Fig. 8, [0116], lines 1-3} to a communications network {"eth 1000", see Fig. 7, [0112].}, the processing device having a memory {"flash 33", see Fig. 7.}, a display {Monitor coupled to graphic accelerator 44, see Fig. 8, [0117].} and an operating system {Windows or Linux, see Fig. 8, [0117].} with pre-installed generic drivers providing a generic communications protocol {PCI express to couple peripheral devices, [0116], first 4 lines, see Fig. 8.} for communication between processing device and a standard class of peripheral devices, the method comprising:*

*b) setting up, by means of a first pre-installed generic audio driver of the operating system, a means for audio communication {"proprietary busses used for transporting video, audio...", [0088].} between the peripheral device and the processing device and by means of a second pre-installed generic driver {multi-viewer driver 2, see Fig. 7, [0112].} of the operating system, a means for data communication {"metadata with building blocks based on standard IP and compression technologies", [0088].} between the peripheral device and the processing device;*



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d) *routing audio data between the processing device and the communication network* {"a characteristic of such a [communication] network is to... route data from one address to another", [0088].} *via the means for audio communication and the transceiver, wherein the first pre-installed generic audio driver is used for transferring the audio data* {"inserting the decoded image [and corresponding audio] on the internal bus of the [pre-installed generic audio driver] the multi-viewer driver 2", [0112].} *between the processing device and the peripheral device.*

*Furthermore, Thompson discloses a) coupling an external peripheral device* {external peripheral devices "NCM 104 and 106" (see Fig. 11, [0049].} *physically to a port* {"access port of a variety of network configurations", [0049].} *of the processing device, the peripheral device having a transceiver* {said nodes "104 and 106" transceiving via COAX, HDMI and ETHERNET (see Fig. 11).};

c) *using the peripheral device to connect the processing device to a communications network* {processing device "Gateway 200" (see Fig. 11) to a communication network "cable 113", [0062].} *via the transceiver;*

Nuyttens and Thompson are analogous art because they are from the same field of endeavor, methods and systems communicating with networked peripherals.

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Nuyttens and Thompson before him or her, to modify Nuyttens' "graphics accelerator 44" incorporating Thompson's "gateway 200".

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The suggestion/motivation for doing so would have been to provide a simple and flexible means for tapping various types of multimedia analog or digital transmissions carried on any installed cable without requiring a change in the cable type, connector or enclosure).

Therefore, it would have been obvious to combine Thompson with Nuyttens to obtain the invention as specified in the instant claim(s).

*As per claim 83, the rejection of claim 82 is incorporated and Nuyttens discloses wherein Step b) comprises presenting the peripheral device to the processing device as a human interface device {"proper mouse and keyboard", [0006].} and wherein the pre-installed generic driver is a human interface device driver {"human machine interface is composed of several displays", [0006].}.*

*As per claim 84, the rejection of claim 82 is incorporated and Nuyttens discloses wherein Step b) comprises presenting the peripheral device to the processing device as a mass storage device {"such as a storage device which is part of mass storage", [0252].} and wherein the pre-installed generic driver is a mass storage device driver.*

*As per claim 85, the rejection of claim 82 is incorporated and Nuyttens discloses wherein Step b) comprises presenting the peripheral device to the processing device as a composite device {"human machine interface is [a composite] of several displays", [0006].} and wherein pre-installed generic drivers drive different*

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**device interfaces independently** {"each compression decoding device 45 may work independently of the other compression decoding devices 45", [0138].}.

**As per claim 87, the rejection of claim 86 is incorporated and Nuyttens discloses wherein the client application is a portable application** {"standard [portable] X.11 methods can be used to feed this information to the DGU 14", [0172], [0171].}.

**As per claim 88, the rejection of claim 82 is incorporated and Nuyttens discloses wherein the peripheral device is adapted to anal se an incoming signal** {the Examiner is presuming the claim language meant to say "analyse an incoming signal".} **from the processing device and if no audio is received, the incoming signal is discarded** {"monitoring elements within a [incoming signal] source (audio metering) in an effective way", [0175].}.

**As per claim 89, the rejection of claim 88 is incorporated and Nuyttens discloses wherein if audio is received, the peripheral device will initiate an additional connection TCP/IP socket** {as a "network switch... a GbE switch", GbE refers to Gigabit Ethernet protocol includes support for both TCP and UDP streams/sockets, [0102].} **to the base unit** {base unit "baseboard of the multi-viewer driver 2", [0112].} **through the communications network.**

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*As per claim 90, the rejection of claim 82 is incorporated and Nuyttens discloses wherein further comprising time-stamping synchronously the audio with the data stream {time-stamping "Real time encoding at full frame rate... [for the data stream] in-sports events phases", [0109].}.*

*As per claim 91, the rejection of claim 90 is incorporated and Nuyttens discloses wherein further comprising encoding, optionally encrypting {encoding "the document [into] SGML, XML, SVG" and so on ([0044])}, where the XML format is well-known for encrypting functionalities.} the audio data.*

*Referring to claims 92-95, and 98-101 are system claims reciting claim language corresponding to the method claim of claims 81-85, 87-91, respectively, thereby rejected under the same rationale as claims 81-85, 87-91.*

*As per claim 97, the rejection of claim 96 is incorporated and Nuyttens wherein the client application is a portable application {"X.11 windows" known for its' portability and versatility in different platforms, [0171].}.*

*Referring to claims 102 is an apparatus claim reciting claim language corresponding to the method claim of claims 81-91, respectively, thereby rejected under the same rationale as claims 81-91.*

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***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 86 and 96 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nuyttens in view of Thompson and further in view of Carlson et al. (USPGPUB No. **2013/0060662 A1**, hereinafter referred to as Carlson).

***As per claim 86, the rejection of claim 82 is incorporated however neither Nuyttens nor Thompson appears to explicitly disclose any limitation in this dependent claim.***

Furthermore, Carlson discloses ***wherein a client application is stored on the peripheral device which when run on the processing device obtains screen scraped data*** {client application "Product catalog system 130" (see Fig. 1) obtaining screen scraped data "screen scraping mechanism", [0023].}.

Nuyttens/Thompson and Carlson are analogous art because they are from the same field of endeavor, methods and systems communicating with networked peripherals.

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Nuyttens/Thompson and Carlson before him or her, to modify

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Nuyttens/Thompson's device incorporating Carlson's "screen scraping mechanism".

The suggestion/motivation for doing so would have been to provide and facilitate the creation of user interfaces that organize results to reduce cognitive load on the user (Carlson [0003], lines 4-6).

Therefore, it would have been obvious to combine Carlson with Nuyttens/Thompson to obtain the invention as specified in the instant claim(s).

*As per claim 96, the rejection of claim 92 is incorporated however neither Nuyttens nor Thompson appears to explicitly disclose any limitation in this dependent claim.*

Furthermore, Carlson discloses *wherein a client application is stored on the peripheral device which when run on the processing device obtains screen scraped data* {client application "Product catalog system 130" (see Fig. 1) obtaining screen scraped data "screen scraping mechanism", [0023].}.

*The 103 motivation for this dependent claim relied upon as recited in claim 86 above.*

#### **Conclusion**

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references indicative of the current state of the art: US 20060101116 A1, and US 20070168481 A1.

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***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER A. BARTELS whose telephone number is (571)270-3182. The examiner can normally be reached on Monday-Friday 9:00a-5:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Henry Tsai can be reached on 571-272-4176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C.A.B./  
Examiner  
Art Unit 2184

/C. A. B./

/HENRY TSAI/  
Supervisory Patent Examiner, Art Unit 2184

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<b>Notice of References Cited</b>	Application/Control No. 16/852,790	Applicant(s)/Patent Under Reexamination Beel et al.	
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**U.S. PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20070033289-A1	02-2007	Nuyttens; Geert	G06F3/1446	709/230
*	B	US-20090247006-A1	10-2009	Thompson; William H.	H04L12/2898	439/527
*	C	US-20130060662-A1	03-2013	Carlson; Andy	G06Q30/06	705/26.61
*	D	US-20060101116-A1	05-2006	Rittman; Danny	H04L12/1813	709/204
*	E	US-20070168481-A1	07-2007	Lambert; Timothy	G06F13/128	709/223
	F					
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**FOREIGN PATENT DOCUMENTS**

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	N					
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	S					
	T					


**NON-PATENT DOCUMENTS**

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	V	
	W	
	X	

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)

Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.



<b><i>Search Notes</i></b> 	<b>Application/Control No.</b> 16/852,790	<b>Applicant(s)/Patent Under Reexamination</b> Beel et al.
	<b>Examiner</b> CHRISTOPHER A BARTELS	<b>Art Unit</b> 2184

CPC - Searched*		
Symbol	Date	Examiner

CPC Combination Sets - Searched*		
Symbol	Date	Examiner
(G06F H04L H04M and relevant subgroups) text search in East	10/01/2020	C.A.B.


US Classification - Searched*			
Class	Subclass	Date	Examiner

\* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Inventor Search in East (USPAT USOCR USGPUB)	07/2020	C.A.B.
Text search in IEEE XPlore (see handout)	10/01/2020	C.A.B.
Text search in Google Patents (see handout)	10/01/2020	C.A.B.


Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

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<b><i>Index of Claims</i></b> 	<b>Application/Control No.</b> 16/852,790	<b>Applicant(s)/Patent Under Reexamination</b> Beel et al.
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✓	<b>Rejected</b>	-	<b>Cancelled</b>	N	<b>Non-Elected</b>	A	<b>Appeal</b>
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	<p><b>Examiner</b></p> <p>CHRISTOPHER A BARTELS</p>	<p><b>Art Unit</b></p> <p>2184</p>

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**EAST Search History****EAST Search History (Prior Art)**

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**EAST Search History (Interference)**

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# **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** ( Not for submission under 37 CFR 1.99)

Application Number

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

CHRISTOPHER A. BARTELS

Attorney Docket Number

BEEL3004C/TL

## **U.S.PATENTS**

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Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/C.A.B/	1	6966035	B1	2005-11-15	Suess et al.	Cited in Specification
/C.A.B/	2	8316138	B2	2012-11-20	Chang	
/C.A.B/	3	8346753	B2	2013-01-01	HAYES	

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/C.A.B/	1	20100087139	A1	2010-04-08	Glass	Cited in Specification and German Search Report
/C.A.B/	2	20060095376	A1	2006-05-04	Mitchell et al.	Cited in Specification
/C.A.B/	3	20090198839	A1	2009-08-06	Banerjee et al.	Cited in Specification

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Application Number		
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First Named Inventor	Koen Simon Herman BEEL	
Art Unit	2184	
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/C.A.B/	4	20110115689	A1	2011-05-19	Sugiyama et al.	Cited in Specification
	5	20020196378	A1	2002-12-26	Slobodin et al.	Cited in Specification
	6	20130067121	A1	2013-05-14	Beel et al.	Related U.S. App. 13/270,659
	7	20130050254	A1	2013-02-28	Tran et al.	
	8	20120331509	A1	2012-12-27	Laksono	
	9	20070005809	A1	2007-01-04	Kobayashi et al.	
	10	20100302130	A1	2010-12-02	Kikuchi et al.	
	11	20070244970	A1	2007-10-18	Watanabe et al.	
	12	20060031779	A1	2006-02-09	Theurer et al.	
	13	20050036509	A1	2005-02-17	Acharya et al.	
/C.A.B/	14	20040263636	A1	2004-12-30	Cutler et al.	

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First Named Inventor	Koen Simon Herman BEEL
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/C.A.B/	15	20090046139	A1	2009-02-19	Cutler et al.	
	16	20110023096	A1	2011-01-27	XIAO et al.	
	17	20070033289	A1	2007-02-08	NUYTTENS et al.	
	18	20140082227	A1	2014-03-20	BEEL et al.	
	19	20040125777	A1	2004-07-01	Doyle et al.	
	20	20070065078	A1	2007-03-22	Jiang	
	21	20090247006	A1	2009-10-01	Thompson	
	22	20130054348	A1	2013-02-28	Holsman et al.	
	23	20100302454	A1	2010-12-02	EPSTEIN et al.	
	24	20090064302	A1	2009-03-05	COLELLA	
/C.A.B/	25	20130060662	A1	2013-03-07	CARLSON et al.	

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/C.A.B/	26	20110078716	A1	2011-03-31	MACWAN	
	27	20100332663	A1	2010-12-30	CHANG	
	28	20090235170	A1	2009-09-17	GOLDEN et al.	
	29	20040128354	A1	2004-07-01	HORIKIRI et al.	corresponds to CN 1499841
	30	20100066806	A1	2010-03-18	LYU	
	31	20070109410	A1	2007-05-17	SIEW	
	32	20110150433	A1	2011-06-23	ALEXANDROV et al.	
	33	20110180380	A1	2011-07-28	Lee	
/C.A.B/	34	20020174254	A1	2002-11-21	KITA et al.	corresponds to CN 1689275

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**FOREIGN PATENT DOCUMENTS**

Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
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Application Number  
PageID #: 3500**INFORMATION DISCLOSURE  
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Filing Date	2020-04-20
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/C.A.B/	1	00/52887	WO	A1	2000-09-08	MICROSOFT CORPORATION		
	2	1246395	EP	A1	2002-10-02	MOTOROLA, INC.		
	3	1187480	EP	A1	2002-03-13	TELESUITE CORP.		
	4	2001/089156	WO	A2	2001-11-22	SONY CORP		
	5	2008/271265	JP	A	2008-11-06	MATSUSHITA ELECTRIC IND CO LTD	English abstract and translation	×
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	13	101442500	CN	A	2009-05-27	XIAOTAO YIN	cited in CN OA, English abstract	<input checked="" type="checkbox"/>
	14	101828392	CN	A	2010-09-08	CREATIVE TECH LTD	cited in CN OA, English abstract	<input checked="" type="checkbox"/>
	15	102023852	CN	A	2011-04-20	JULONG EDUCATIONAL TECHNOLOGY CO LTD	cited in CN OA, English abstract	<input checked="" type="checkbox"/>
	16	1689275	CN	A	2005-10-26	SONY CORP	English abstract, corresponds to US 20020174254	<input checked="" type="checkbox"/>
/C.A.B/	17	2007/137415	WO	A1	2007-12-06	SMART TECH INC	cited in EP Office Communication	<input type="checkbox"/>

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**NON-PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>
/C.A.B/	1	International Search Report (ISR) dated March 6, 2013, for PCT/EP2012/068166.	
/C.A.B/	2	International Search Report (ISR) dated March 19, 2013, for PCT/EP2012/068167.	
/C.A.B/	3	International Search Report (ISR) dated March 4, 2013, for PCT/EP2012/068168.	



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/C.A.B/	4	International Search Report (ISR) dated January 28, 2013, for PCT/EP2012/068169.	
	5	British Search Report dated August 28, 2012, for GB 1206841.7.	
	6	German Search Report dated November 17, 2011, for DE 102011055443.2.	
	7	Jiang et al., "A Novel Wireless Approach for Conference Projecting and Cooperating", Lecture Notes in Computer Science, Vol. 4159, pp. 688-697, 2006. (cited in GB 1206841.7 Search Report)	
	8	Martin Trautschold, iPhone 4 Made Simple, 2010, Apress, Pages 1-819.	
	9	Office Action in related U.S. Application Number 15/449,048, dated February 16, 2018.	
	10	US Office Action dated March 29, 2016, for 14/395,364.	
	11	Marc AL-HAMES et al., Audio-Visual Processing in Meetings: Seven Questions and Current AMI Answers, 2006.	
	12	Mood indicators on electronic meeting tools" IBM, IP.com number: IPCOMOOOO1171D, Publication Date: March 12, 2003.	
	13	Final Office Action in related U.S. Application No. 14/278,442, dated June 8, 2018.	
/C.A.B/	14	Office Action in related Chinese Application Number 201280055744.2, dated March 30, 2018.	×

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

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Art Unit	2184	
Examiner Name		
Attorney Docket Number	BEEL3004C/TL	

/C.A.B/	15	Office Action in related U.S. Application Number 14/344,836, dated February 28, 2018.	<input type="checkbox"/>
	16	U.S. Office Action dated October 20, 2017, for U.S. Application No. 14/344,836.	<input type="checkbox"/>
	17	European Notice of Opposition dated September 27, 2017 for EP 2756668.	<input type="checkbox"/>
	18	StarTech.com: USB to DVI External Dual Monitor Video Adapter/USS to VGA External Dual Monitor Video Adapter, User Manual dated May 19, 2011.	<input type="checkbox"/>
	19	Microsoft Community, conversation on August 30, 2011 about USB2VGA Adapter, retrieved on September 7, 2017.	<input type="checkbox"/>
	20	Webopedia Definition of Peripheral Device, retrieved on September 7, 2017.	<input type="checkbox"/>
	21	Trulink Wireless USB2VGA Adapter, Quick Start Guide, retrieved from www.c2g.com.	<input type="checkbox"/>
	22	HWebPage on Availability of Trulink, retrieved on September 7, 2017.	<input type="checkbox"/>
	23	Chinese Office Action dated October 31, 2017, for CN 201280001542.X, and English translation thereof.	<input type="checkbox"/>
	24	European Office Communication dated June 15, 2015, for EP 12762258.7.	<input type="checkbox"/>
/C.A.B/	25	European Office Action dated August 1, 2016, for EP 12762258.7.	<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number

PageID #: 3504

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

Attorney Docket Number

BEEL3004C/TL

/C.A.B/	26	U.S. Office Action dated June 17, 2016, for 14/278,442.	<input type="checkbox"/>
	27	U.S. Office Action dated June 17, 2016, for 14/725,401.	<input type="checkbox"/>
	28	Chinese Office Action dated April 5, 2017, for CN 201280055744.2, and English translation thereof.	<input type="checkbox"/>
	29	U.S. Office Action dated May 3, 2017, for U.S. Application No. 14/344,836.	<input type="checkbox"/>
	30	Chinese Office Action dated September 26, 2017, for CN 201280055744.2, and English translation thereof.	<input checked="" type="checkbox"/>
	31	U.S. Office Action dated September 28, 2017, for U.S. Application No. 14/278,442.	<input type="checkbox"/>
	32	"Quick Connect Wireless with Epson Projectors", retrieved from <a href="https://www.youtube.com/watch?v=9POz4-HyDXY">https://www.youtube.com/watch?v=9POz4-HyDXY</a> , November 3, 2009.	<input type="checkbox"/>
	33	"Remote Framebuffer Protocol (RFB)", Internet standard IETF RFC 6143 , March 2011.	<input type="checkbox"/>
	34	Richardson & Wood, "The RFB Protocol", Cambridge: ORL, 1998.	<input type="checkbox"/>
	35	"Manual of the Epson projectors", retrieved from <a href="http://esupport.epson-europe.com/ViewArticle.aspx?lng=sv-SE&amp;kbid=328038&amp;data=bOU002FRIfu7YFtMOBp2mpSKntPq1A26Wyyw&amp;cl=1">http://esupport.epson-europe.com/ViewArticle.aspx?lng=sv-SE&amp;kbid=328038&amp;data=bOU002FRIfu7YFtMOBp2mpSKntPq1A26Wyyw&amp;cl=1</a> , February 14, 2011.	<input type="checkbox"/>
/C.A.B/	36	Chinese Office Action dated December 27, 2016, for CN 201280074077.2, and English translation thereof.	<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		
Filing Date		2020-04-20
First Named Inventor	Koen Simon Herman BEEL	
Art Unit	2184	
Examiner Name		
Attorney Docket Number	BEEL3004C/TL	

/C.A.B/	37	Final Office Action in corresponding U.S. App. 14/725,401 dated January 26, 2017.	<input type="checkbox"/>
	38	Final Office Action in corresponding U.S. App. 14/278,442 dated January 26, 2017.	<input type="checkbox"/>
	39	Chinese Office Action in Chinese Application Number 201280074077.2, dated January 4, 2018.	<input checked="" type="checkbox"/>
	40	International Preliminary Report on Patentability (IPRP) dated March 27, 2014, for PCT/EP2012/068166.	<input type="checkbox"/>
	41	International Preliminary Report on Patentability (IPRP) dated March 27, 2014, for PCT/EP2012/068167.	<input type="checkbox"/>
	42	International Preliminary Report on Patentability (IPRP) dated March 27, 2014, for PCT/EP2012/068168.	<input type="checkbox"/>
	43	Request for Reexamination of Patent No. 8,756,348, dated February 9, 2018.	<input type="checkbox"/>
	44	Request for Reexamination of Patent No. 9,083,769, dated February 9, 2018.	<input type="checkbox"/>
	45	Intervention according to Art. 105 EPC in corresponding European patent 2756668, dated May 3, 2018.	<input type="checkbox"/>
	46	Chinese Office Action dated November 4, 2016, for CN 201280001542.X, and English translation thereof.	<input type="checkbox"/>
/C.A.B/	47	European Office Communication dated December 21, 2015, for EP 12762258.7.	<input type="checkbox"/>

Application Number  
PageID #: 3506**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	
Attorney Docket Number	BEEL3004C/TL

/C.A.B/	48	Chinese Office Action dated June 28, 2017, for CN 201280074077.2, and English translation thereof.	<input checked="" type="checkbox"/>
/C.A.B/	49	Chinese Office Action dated July 4, 2017, for CN 201280055667.0, and English translation thereof.	<input checked="" type="checkbox"/>
/C.A.B/	50	Chinese Office Action dated July 21, 2017, for CN 20128001542.X, and English translation thereof.	<input checked="" type="checkbox"/>

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Examiner Signature	/CHRISTOPHER A BARTELS/	Date Considered	10/01/2020
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<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

Application Number  
PageID #: 3507**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	
Attorney Docket Number	BEEL3004C/TL

**CERTIFICATION STATEMENT**

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2020-04-20
Name/Print	THOMAS LEE	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
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Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PageID #: 3509

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Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	BARTELS, CHRISTOPHER A.
Attorney Docket Number	BEEL3004C/TL

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Application Number  
PageID #: 3510

16852790

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

BARTELS, CHRISTOPHER A.

Attorney Docket Number

BEEL3004C/TL

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

/C.A.B/	1	U.S. Office Action in corresponding U.S. Application No. 16/034,846, dated June 25, 2020.
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Examiner Signature	/CHRISTOPHER A BARTELS/	Date Considered	10/01/2020
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Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	BARTELS, CHRISTOPHER A.
Attorney Docket Number	BEEL3004C/TL

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Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2020-06-30
Name/Print	THOMAS LEE	Registration Number	66396

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Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PageID #: 3513

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Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Bartels, Christopher A.
Attorney Docket Number	BEEL3004C/TL

## U.S.PATENTS

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Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/C.A.B/	1	7853535	B2	2010-12-14	Colella	
/C.A.B/	2	7908401	B2	2011-03-15	Chang	

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Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/C.A.B/	1	20060080707	A1	2006-04-13	Laksono	
/C.A.B/	2	20100149206	A1	2010-06-17	Shigehisa et al.	

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/C.A.B/	1	1525300	CN	A	2004-09-01	Microsoft Corp.	Abstract.	×

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Bartels, Christopher A.
Attorney Docket Number	BEEL3004C/TL

/C.A.B/	2	1555197	CN	A	2004-12-15	Shenzhen Postgraduate Inst Tsi	Abstract.	<input checked="" type="checkbox"/>
/C.A.B/	3	101046952	CN	A	2007-10-03	Kei Nakayama	Abstract.	<input checked="" type="checkbox"/>
/C.A.B/	4	101075896	CN	A	2007-11-21	Polycom Inc.	Abstract.	<input checked="" type="checkbox"/>
/C.A.B/	5	102025774	CN	A	2011-04-20	TPV Display Technology Xiamen	Abstract.	<input checked="" type="checkbox"/>
/C.A.B/	6	102088593	CN	A	2011-06-08			<input checked="" type="checkbox"/>
/C.A.B/	7	2007148904	JP	A	2007-06-14	Toshiba Corp	Abstract.	<input checked="" type="checkbox"/>
/C.A.B/	8	201012222	TW	A	2010-03-16	Primax Electronics Ltd	Abstract.	<input checked="" type="checkbox"/>

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/C.A.B/	1	Chinese Office Action in corresponding Chinese Application No. 201810229467.1, dated April 7, 2020.	<input checked="" type="checkbox"/>
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Application Number  
PageID #: 3515

16852790

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

Bartels, Christopher A.

Attorney Docket Number

BEEL3004C/TL

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Examiner Signature

/CHRISTOPHER A BARTELS/

Date Considered

10/01/2020

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That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2020-08-06
Name/Print	THOMAS LEE	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



**EAST Search History****EAST Search History (Prior Art)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1,380,600	(G06F\$ H04L\$ H04M\$).CPC. and (driver audio speaker conference teleconference)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/10/01 12:07
L2	115,482	L1 and (peripheral endpoint module speaker webcam web adj camera webcamera multimedia multi adj media) with (bus interface network select\$5 switch\$3).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/10/01 12:10
L3	129	L2 and (mass adj storage with (driver function\$5) screen near2 scrap\$4).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/10/01 12:11
L4	111	L3 AND (network lan local near2 (area network) ethernet usb universal near2 (serial bus) antenna radio wireless\$2 wire adj less\$2).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/10/01 12:12
L5	7	L4 and (hypervisor virtual\$4 near2 (audio conferenc\$3 stream video movie motion media)).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/10/01 12:13
L6	6	L5 and (driver dll)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/10/01 12:14

S1	2	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/03/10 20:50
S2	204	(audio near2 driver audio adj driver) and (hmi human near2 (machine interface)) and (usb with (mass storage class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/04/03 08:30
S3	1	S2 and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/04/03 08:30
S4	12,070	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/04/03 08:33
S5	95	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2017/04/03 08:34
S7	13	"2007137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/04/03 08:43
S8	3	"20070137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/04/03 08:43

S9	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/04/03 08:47
S10	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/04/03 08:57
S11	1	(S7 S8 S9 S10) and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/04/03 09:05
S12	95	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2017/04/03 10:57
S13	77	S12 and (portable cellular pda smartphone smart adj phone mobile)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/04/03 10:57
S14	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/04/03 10:59
S15	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/04/03 10:59

S16	8	S12 and usb	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2017/04/03 11:03
S17	10	((("BEEL") near3 ("Koen"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/04/03 13:24
S18	11	((("NIR") near3 ("Yoav"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/04/03 13:24
S19	10	((("LOUWET") near3 ("Filip"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/04/03 13:24
S20	15	((("COEN") near3 ("Guy"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/04/03 13:24
S21	3	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/13 22:55
S22	224	(audio near2 driver audio adj driver) and (hmi human near2 (machine interface)) and (usb with (mass storage class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/13 22:55
S23	1	S22 and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/13 22:55
S24	12,761	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/13 22:55
S25	98	(web data screen) near2 scrap\$4	US-PGPUB; USPAT;	AND	ON	2017/10/13 22:55

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S26	13	"2007137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/13 22:55
S27	3	"20070137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/13 22:55
S28	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/13 22:55
S29	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/13 22:55
S30	1	(S26 S27 S28 S29) and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/13 22:55
S31	98	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2017/10/13 22:55
S32	79	S31 and (portable cellular pda smartphone smart adj phone mobile)	US-PGPUB; USPAT; USOCR;	OR	ON	2017/10/13 22:55

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S33	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/13 22:55
S34	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/13 22:55
S35	8	S31 and usb	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2017/10/13 22:55
S36	11	((("BEEL") near3 ("Koen")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/13 22:55
S37	12	((("NIR") near3 ("Yoav")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/13 22:55
S38	11	((("LOUWET") near3 ("Filip")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/13 22:55
S39	16	((("COEN") near3 ("Guy")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/13 22:55
S40	3	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S41	224	(audio near2 driver audio adj driver) and (hmi human near2 (machine interface)) and (usb with (mass storage class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2017/10/16 14:06

			DERWENT; IBM_TDB			
S42	1	S41 and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S43	12,797	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S44	98	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2017/10/16 14:06
S45	13	"2007137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S46	3	"20070137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S47	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S48	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2017/10/16 14:06

			DERWENT; IBM_TDB			
S49	1	(S45 S46 S47 S48) and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S50	98	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2017/10/16 14:06
S51	79	S50 and (portable cellular pda smartphone smart adj phone mobile)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S52	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S53	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S54	8	S50 and usb	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2017/10/16 14:06
S55	11	((("BEEL") near3 ("Koen")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/16 14:06



S56	12	((("NIR") near3 ("Yoav"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/16 14:06
S57	11	((("LOUWET") near3 ("Filip"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/16 14:06
S58	16	((("COEN") near3 ("Guy"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/16 14:06
S59	3	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S60	224	(audio near2 driver audio adj driver) and (hmi human near2 (machine interface)) and (usb with (mass storage class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S61	1	S60 and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S62	12,797	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S63	98	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2017/10/16 14:06
S64	13	"2007137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2017/10/16 14:06

			DERWENT; IBM_TDB			
S65	3	"20070137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S66	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S67	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S68	1	(S64 S65 S66 S67) and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S69	98	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2017/10/16 14:06
S70	79	S69 and (portable cellular pda smartphone smart adj phone mobile)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S71	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2017/10/16 14:06

			DERWENT; IBM_TDB			
S72	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/10/16 14:06
S73	8	S69 and usb	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2017/10/16 14:06
S74	11	((("BEEL") near3 ("Koen"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/16 14:06
S75	12	((("NIR") near3 ("Yoav"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/16 14:06
S76	11	((("LOUWET") near3 ("Filip"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/16 14:06
S77	16	((("COEN") near3 ("Guy"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2017/10/16 14:06
S78	3	"14344836"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/01/16 08:58
S79	3	(US-20070033289-\$ or US- 20130060662-\$).did. or (US- 8346753-\$).did.	US-PGPUB; USPAT	OR	OFF	2018/02/16 19:47
S80	1	S79 and (driver)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/16 19:47
S81	1,096	(audio speaker) with (driver module) and (driver module) with (generic and specific)	US-PGPUB; USPAT; USOCR;	OR	OFF	2018/02/16 19:49

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S82	636	S81 and (ad hoc ad adj hoc network\$3 lan vpn wan) and (port peripheral)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/16 19:50
S83	522	S82 and (window microsoft operat\$3 near2 system)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/16 19:50
S84	544	S82 and (window microsoft operat\$3 near2 system kernel linux unix mac os adj x)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/16 19:51
S85	22	S84 not S83	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/16 19:51
S86	6	"20070033289"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/02/20 11:18
S87	3	"14344836"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/07/18 08:52
S88	7	(US-20070033289-\$ or US-20130060662-\$ or US-20040125777-\$ or US-20070065078-\$ or US-	US-PGPUB; USPAT	OR	ON	2018/07/23 15:17

		20090247006-\$ or US-20130054348-\$).did. or (US-8346753-\$).did.				
S89	5	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S90	255	(audio near2 driver audio adj driver) and (hmi human near2 (machine interface)) and (usb with (mass storage class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S91	2	S90 and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S92	14,620	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S93	111	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/26 07:58
S94	15	"2007137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S95	3	"20070137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2018/11/26 07:58

			DERWENT; IBM_TDB			
S96	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S97	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S98	1	(S94 S95 S96 S97) and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S99	111	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/26 07:58
S100	92	S99 and (portable cellular pda smartphone smart adj phone mobile)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S101	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S102	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2018/11/26 07:58

			DERWENT; IBM_TDB			
S103	12	S99 and usb	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/26 07:58
S104	14	((("BEEL") near3 ("Koen")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/11/26 07:58
S105	15	((("NIR") near3 ("Yoav")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/11/26 07:58
S106	14	((("LOUWET") near3 ("Filip")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/11/26 07:58
S107	19	((("COEN") near3 ("Guy")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/11/26 07:58
S108	5	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S109	255	(audio near2 driver audio adj driver) and (hmi human near2 (machine interface)) and (usb with (mass storage class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S110	2	S109 and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S111	14,620	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58

S112	111	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/26 07:58
S113	15	"2007137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S114	3	"20070137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S115	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S116	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S117	1	(S113 S114 S115 S116) and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S118	111	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/26 07:58



S119	92	S118 and (portable cellular pda smartphone smart adj phone mobile)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S120	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S121	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S122	12	S118 and usb	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/26 07:58
S123	14	((("BEEL") near3 ("Koen"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/11/26 07:58
S124	15	((("NIR") near3 ("Yoav"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/11/26 07:58
S125	14	((("LOUWET") near3 ("Filip"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/11/26 07:58
S126	19	((("COEN") near3 ("Guy"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/11/26 07:58
S127	5	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S128	255	(audio near2 driver audio adj driver) and (hmi human near2 (machine	US-PGPUB; USPAT;	OR	ON	2018/11/26 07:58

		interface)) and (usb with (mass storage class))	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S129	2	S128 and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S130	14,620	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S131	111	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/26 07:58
S132	15	"2007137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S133	3	"20070137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S134	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S135	2	"20020174254"	US-PGPUB; USPAT; USOCR;	OR	ON	2018/11/26 07:58

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S136	1	(S132 S133 S134 S135) and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S137	111	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/26 07:58
S138	92	S137 and (portable cellular pda smartphone smart adj phone mobile)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S139	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S140	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S141	12	S137 and usb	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/26 07:58
S142	14	((("BEEL") near3 ("Koen")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/11/26 07:58

S143	15	((("NIR") near3 ("Yoav"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/11/26 07:58
S144	14	((("LOUWET") near3 ("Filip"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/11/26 07:58
S145	19	((("COEN") near3 ("Guy"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/11/26 07:58
S146	5	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S147	255	(audio near2 driver audio adj driver) and (hmi human near2 (machine interface)) and (usb with (mass storage class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S148	2	S147 and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S149	14,620	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S150	111	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/26 07:58
S151	15	"2007137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2018/11/26 07:58

			DERWENT; IBM_TDB			
S152	3	"20070137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S153	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S154	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S155	1	(S151 S152 S153 S154) and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S156	111	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/26 07:58
S157	92	S156 and (portable cellular pda smartphone smart adj phone mobile)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S158	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2018/11/26 07:58

			DERWENT; IBM_TDB			
S159	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S160	12	S156 and usb	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2018/11/26 07:58
S161	14	((("BEEL") near3 ("Koen"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/11/26 07:58
S162	15	((("NIR") near3 ("Yoav"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/11/26 07:58
S163	14	((("LOUWET") near3 ("Filip"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/11/26 07:58
S164	19	((("COEN") near3 ("Guy"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/11/26 07:58
S165	3	"14344836"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S166	3	(US-20070033289-\$ or US-20130060662-\$).did. or (US-8346753-\$).did.	US-PGPUB; USPAT	OR	OFF	2018/11/26 07:58
S167	1	S166 and (driver)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/11/26 07:58
S168	1,203	(audio speaker) with (driver module) and (driver module) with (generic and specific)	US-PGPUB; USPAT; USOCR;	OR	OFF	2018/11/26 07:58

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S169	683	S168 and (ad hoc ad adj hoc network\$3 lan vpn wan) and (port peripheral)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/11/26 07:58
S170	566	S169 and (window microsoft operat\$3 near2 system)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/11/26 07:58
S171	588	S169 and (window microsoft operat\$3 near2 system kernel linux unix mac os adj x)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/11/26 07:58
S172	22	S171 not S170	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/11/26 07:58
S173	6	"20070033289"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/11/26 07:58
S174	3	"14344836"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 07:58
S175	7	(US-20070033289-\$ or US-20130060662-\$ or US-20040125777-\$ or US-20070065078-\$ or US-	US-PGPUB; USPAT	OR	ON	2018/11/26 07:58

		20090247006-\$ or US-20130054348-\$).did. or (US-8346753-\$).did.				
S176	3	"20110180380"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 08:01
S177	7	"20100064063"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 08:06
S178	20	"8756348"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 08:16
S179	2	"8756348".PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 08:16
S180	34	"0189156" "2010105335" "20100302454"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 08:21
S181	18	"0189156"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 08:21
S182	17	("2010105335" "20100302454")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2018/11/26 09:48



			DERWENT; IBM_TDB			
S183	8	("2010105335" "20100302454").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 09:48
S184	0	"14725401".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 11:21
S185	2	"20150263905"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 11:21
S186	6	("20090064302" "20100066806").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 11:22
S187	30	("20100064063" "2013037979" "2008165007" "2000242257")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 11:39
S189	440	"I8" and (peripheral endpoint module speaker webcam web adj camera webcamera multimedia multi adj media) with (bus interface network select\$5 switch\$3).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 12:29
S190	27,066	S188 and (peripheral endpoint module speaker webcam web adj camera webcamera multimedia multi adj media) with (bus interface network select\$5 switch\$3).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2018/11/26 12:30

			DERWENT; IBM_TDB			
S191	74	S190 and (mass adj storage with (driver function\$5) screen near2 scrap\$4).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 12:38
S192	12	S190 and (mass adj storage with (driver function\$5) and screen near2 scrap\$4).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/26 12:38
S199	14	"20110188391" "20110092198"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/23 13:15
S200	5	("20110188391" "20110092198").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/23 13:15
S201	5	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:18
S202	282	(audio near2 driver audio adj driver) and (hmi human near2 (machine interface)) and (usb with (mass storage class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:18
S203	3	S202 and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2019/11/12 10:18

			DERWENT; IBM_TDB			
S204	16,592	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:18
S205	124	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:18
S206	15	"2007137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:18
S207	3	"20070137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:18
S208	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:18
S209	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:18
S210	1	(S206 S207 S208 S209) and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2019/11/12 10:18

			DERWENT; IBM_TDB			
S211	124	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:18
S212	103	S211 and (portable cellular pda smartphone smart adj phone mobile)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:18
S213	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:18
S214	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:18
S215	14	S211 and usb	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:18
S216	14	((("BEEL") near3 ("Koen"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:18
S217	15	((("NIR") near3 ("Yoav"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:18
S218	14	((("LOUWET") near3 ("Filip"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S219	20	((("COEN") near3 ("Guy"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19

S220	5	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S221	282	(audio near2 driver audio adj driver) and (hmi human near2 (machine interface)) and (usb with (mass storage class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S222	3	S221 and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S223	16,592	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S224	124	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:19
S225	15	"2007137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S226	3	"20070137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19

S227	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S228	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S229	1	(S225 S226 S227 S228) and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S230	124	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:19
S231	103	S230 and (portable cellular pda smartphone smart adj phone mobile)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S232	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S233	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19

S234	14	S230 and usb	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:19
S235	14	((("BEEL") near3 ("Koen"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S236	15	((("NIR") near3 ("Yoav"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S237	14	((("LOUWET") near3 ("Filip"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S238	20	((("COEN") near3 ("Guy"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S239	5	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S240	282	(audio near2 driver audio adj driver) and (hmi human near2 (machine interface)) and (usb with (mass storage class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S241	3	S240 and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S242	16,592	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S243	124	(web data screen) near2 scrap\$4	US-PGPUB; USPAT;	AND	ON	2019/11/12 10:19

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S244	15	"2007137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S245	3	"20070137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S246	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S247	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S248	1	(S244 S245 S246 S247) and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S249	124	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:19
S250	103	S249 and (portable cellular pda smartphone smart adj phone mobile)	US-PGPUB; USPAT; USOCR;	OR	ON	2019/11/12 10:19



			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S251	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S252	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S253	14	S249 and usb	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:19
S254	14	((("BEEL") near3 ("Koen")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S255	15	((("NIR") near3 ("Yoav")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S256	14	((("LOUWET") near3 ("Filip")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S257	20	((("COEN") near3 ("Guy")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S258	5	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S259	282	(audio near2 driver audio adj driver) and (hmi human near2 (machine interface)) and (usb with (mass storage class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2019/11/12 10:19

			DERWENT; IBM_TDB			
S260	3	S259 and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S261	16,592	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S262	124	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:19
S263	15	"2007137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S264	3	"20070137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S265	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S266	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2019/11/12 10:19

			DERWENT; IBM_TDB			
S267	1	(S263 S264 S265 S266) and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S268	124	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:19
S269	103	S268 and (portable cellular pda smartphone smart adj phone mobile)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S270	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S271	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S272	14	S268 and usb	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:19
S273	14	((("BEEL") near3 ("Koen")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19

S274	15	((("NIR") near3 ("Yoav"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S275	14	((("LOUWET") near3 ("Filip"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S276	20	((("COEN") near3 ("Guy"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S277	3	"14344836"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S278	3	(US-20070033289-\$ or US-20130060662-\$).did. or (US-8346753-\$).did.	US-PGPUB; USPAT	OR	OFF	2019/11/12 10:19
S279	1	S278 and (driver)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/11/12 10:19
S280	1,360	(audio speaker) with (driver module) and (driver module) with (generic and specific)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/11/12 10:19
S281	759	S280 and (adhoc ad adj hoc network\$3 lan vpn wan) and (port peripheral)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/11/12 10:19
S282	637	S281 and (window microsoft operat\$3 near2 system)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/11/12 10:19

S283	662	S281 and (window microsoft operat\$3 near2 system kernel linux unix mac os adj x)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/11/12 10:19
S284	25	S283 not S282	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/11/12 10:19
S285	7	"20070033289"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/11/12 10:19
S286	3	"14344836"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S287	7	(US-20070033289-\$ or US-20130060662-\$ or US-20040125777-\$ or US-20070065078-\$ or US-20090247006-\$ or US-20130054348-\$).did. or (US-8346753-\$).did.	US-PGPUB; USPAT	OR	ON	2019/11/12 10:19
S288	5	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S289	282	(audio near2 driver audio adj driver) and (hmi human near2 (machine interface)) and (usb with (mass storage class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19

S290	3	S289 and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S291	16,592	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S292	124	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:19
S293	15	"2007137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S294	3	"20070137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S295	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S296	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19

S297	1	(S293 S294 S295 S296) and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S298	124	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:19
S299	103	S298 and (portable cellular pda smartphone smart adj phone mobile)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S300	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S301	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S302	14	S298 and usb	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:19
S303	14	((("BEEL") near3 ("Koen"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S304	15	((("NIR") near3 ("Yoav"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19

S305	14	((("LOUWET") near3 ("Filip"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S306	20	((("COEN") near3 ("Guy"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S307	5	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S308	282	(audio near2 driver audio adj driver) and (hmi human near2 (machine interface)) and (usb with (mass storage class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S309	3	S308 and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S310	16,592	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S311	124	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:19
S312	15	"2007137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19



S313	3	"20070137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S314	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S315	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S316	1	(S312 S313 S314 S315) and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S317	124	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:19
S318	103	S317 and (portable cellular pda smartphone smart adj phone mobile)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S319	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19

S320	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S321	14	S317 and usb	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:19
S322	14	((("BEEL") near3 ("Koen"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S323	15	((("NIR") near3 ("Yoav"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S324	14	((("LOUWET") near3 ("Filip"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S325	20	((("COEN") near3 ("Guy"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S326	5	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S327	282	(audio near2 driver audio adj driver) and (hmi human near2 (machine interface)) and (usb with (mass storage class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S328	3	S327 and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S329	16,592	(web data screen) near2 scrap\$4	US-PGPUB; USPAT;	OR	ON	2019/11/12 10:19

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S330	124	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:19
S331	15	"2007137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S332	3	"20070137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S333	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S334	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S335	1	(S331 S332 S333 S334) and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S336	124	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR;	AND	ON	2019/11/12 10:19

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S337	103	S336 and (portable cellular pda smartphone smart adj phone mobile)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S338	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S339	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S340	14	S336 and usb	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:19
S341	14	((("BEEL") near3 ("Koen"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S342	15	((("NIR") near3 ("Yoav"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S343	14	((("LOUWET") near3 ("Filip"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S344	20	((("COEN") near3 ("Guy"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S345	5	"20150169477"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2019/11/12 10:19

			DERWENT; IBM_TDB			
S346	282	(audio near2 driver audio adj driver) and (hmi human near2 (machine interface)) and (usb with (mass storage class))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S347	3	S346 and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S348	16,592	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S349	124	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:19
S350	15	"2007137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S351	3	"20070137415"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S352	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2019/11/12 10:19

			DERWENT; IBM_TDB			
S353	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S354	1	(S350 S351 S352 S353) and screen near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S355	124	(web data screen) near2 scrap\$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2019/11/12 10:19
S356	103	S355 and (portable cellular pda smartphone smart adj phone mobile)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S357	2	"20020174254"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S358	9	("20110023096" "20070033289" "20140082227").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S359	14	S355 and usb	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	AND	ON	2019/11/12 10:19

			DERWENT; IBM_TDB			
S360	14	((("BEEL") near3 ("Koen"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S361	15	((("NIR") near3 ("Yoav"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S362	14	((("LOUWET") near3 ("Filip"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S363	20	((("COEN") near3 ("Guy"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2019/11/12 10:19
S364	3	"14344836"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S365	3	(US-20070033289-\$ or US-20130060662-\$).did. or (US-8346753-\$).did.	US-PGPUB; USPAT	OR	OFF	2019/11/12 10:19
S366	1	S365 and (driver)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/11/12 10:19
S367	1,360	(audio speaker) with (driver module) and (driver module) with (generic and specific)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/11/12 10:19
S368	759	S367 and (ad hoc ad adj hoc network\$3 lan vpn wan) and (port peripheral)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/11/12 10:19
S369	637	S368 and (window microsoft operat\$3 near2 system)	US-PGPUB; USPAT; USOCR;	OR	OFF	2019/11/12 10:19

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S370	662	S368 and (window microsoft operat\$3 near2 system kernel linux unix mac os adj x)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/11/12 10:19
S371	25	S370 not S369	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/11/12 10:19
S372	7	"20070033289"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2019/11/12 10:19
S373	3	"14344836"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S374	7	(US-20070033289-\$ or US- 20130060662-\$ or US- 20040125777-\$ or US- 20070065078-\$ or US- 20090247006-\$ or US- 20130054348-\$).did. or (US- 8346753-\$).did.	US-PGPUB; USPAT	OR	ON	2019/11/12 10:19
S375	3	"20110180380"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S376	7	"20100064063"	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	ON	2019/11/12 10:19



			JPO; DERWENT; IBM_TDB			
S377	29	"8756348"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S378	3	"8756348".PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S379	48	"0189156" "2010105335" "20100302454"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S380	32	"0189156"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S381	17	("2010105335" "20100302454")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S382	8	("2010105335" "20100302454").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S383	0	"14725401".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2019/11/12 10:19

			DERWENT; IBM_TDB			
S384	2	"20150263905"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S385	6	("20090064302" "20100066806").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S386	30	("20100064063" "2013037979" "2008165007" "2000242257")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S387	492	"l8" and (peripheral endpoint module speaker webcam web adj camera webcamera multimedia multi adj media) with (bus interface network select\$5 switch\$3).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S388	364,447	(driver software process method) with (generic install\$5 pre adj install\$5 windows linux osx apple operat\$3 near2 system).dm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S389	28,974	S388 and (peripheral endpoint module speaker webcam web adj camera webcamera multimedia multi adj media) with (bus interface network select\$5 switch\$3).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S390	75	S389 and (mass adj storage with (driver function\$5) screen near2 scrap\$4).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2019/11/12 10:19

			DERWENT; IBM_TDB			
S391	12	S389 and (mass adj storage with (driver function\$5) and screen near2 scrap\$4).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S392	15	"20110188391" "20110092198"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S393	5	("20110188391" "20110092198").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/11/12 10:19
S400	28	("20030120849"   "20060233191"   "20070162661"   "20080088634"   "20080182518"   "20090023475"   "20090029647"   "20090251621"   "20100022274"   "20100077021"   "20100091987"   "20100115145"   "20100154014"   "20100297964"   "20100309896"   "20110010470"   "20110010607"   "20110038005"   "20110210983"   "6601087"   "7584313"   "7762470"   "8069465"   "8327410"   "8521926"   "8601470"   "8717599"   "8896656").PN.	US-PGPUB; USPAT	OR	ON	2020/05/14 12:31
S401	28	S400 and (driver audio speaker conference teleconference)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/05/14 13:10
S402	5	S400 and (driver audio speaker conference teleconference) with (generic proprietary unique intellectual property)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2020/05/14 13:15

			DERWENT; IBM_TDB			
S403	291,278	("20120331509"   "6966035"   "20070033289"   "20100332663"   "20100064063"   "20110188391"   "20120054372"   "20090023475"   "20100091987"   "7762470"   "20050036509"   "20090046139"   "8316138"   "20090092198"   "20090300520"   "20110150433"   "20100302454"   "20090247006"   "20110188391"   "20100077021"   "20110010470"   "20110038005"   "20020196378"   "20070005809"   "20070244970"   "20060233191"   "20110210983"   "7584313"   "8521926"   "20040263636"   "20090198839"   "20130050254"   "20090064302"   "20070033289"   "20130060662"   "8346753"   "20110092198"   "20030120849"   "20090029647"   "20090251621"   "20100022274"   "20100115145"   "20100154014"   "20100087139"   "20110023096"   "20090235170"   "20110180380"   "20100066806"   "20090189981"   "20070162661"   "8327410"   "8601470"   "20060031779"   "20140082227"   "20070109410"   "20100066806"   "20110078716"   "20040125777"   "20130054348"   "6601087"   "8896656"   "20100302130"   "20130067121"   "20050015719"   "20110179182"   "20020174254"   "20040128354"   "20110092198"   "20080182518"   "20100297964"   "20110010607"   "8069465"   "8717599"   "20060095376"   "20110115689"   "20050122392"   "20070065078"   "20090064302"   "20080088634"   "20100309896")".PN"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/05/14 14:26
S404	212	("20120331509"   "6966035"   "20070033289"   "20100332663"   "20100064063"   "20110188391"   "20120054372"   "20090023475"   "20100091987"   "7762470"   "20050036509"   "20090046139"   "8316138"   "20090092198"   "20090300520"   "20110150433"   "20100302454"   "20090247006"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/05/14 14:39

		"20110188391"   "20100077021"   "20110010470"   "20110038005"   "20020196378"   "20070005809"   "20070244970"   "20060233191"   "20110210983"   "7584313"   "8521926"   "20040263636"   "20090198839"   "20130050254"   "20090064302"   "20070033289"   "20130060662"   "8346753"   "20110092198"   "20030120849"   "20090029647"   "20090251621"   "20100022274"   "20100115145"   "20100154014"   "20100087139"   "20110023096"   "20090235170"   "20110180380"   "20100066806"   "20090189981"   "20070162661"   "8327410"   "8601470"   "20060031779"   "20140082227"   "20070109410"   "20100066806"   "20110078716"   "20040125777"   "20130054348"   "6601087"   "8896656"   "20100302130"   "20130067121"   "20050015719"   "20110179182"   "20020174254"   "20040128354"   "20110092198"   "20080182518"   "20100297964"   "20110010607"   "8069465"   "8717599"   "20060095376"   "20110115689"   "20050122392"   "20070065078"   "20090064302"   "20080088634"   "20100309896").PN.				
S405	0	S400 not S404	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/05/14 14:40
S406	18	"20020054044"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/06/20 19:38
S407	0	((smart adj technology) (smart adj technology).as.) and linq with ((meeting conference ball participant) and (wifi wireless\$2 wire adj less\$2 radio frequency link))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2020/06/20 20:24

			DERWENT; IBM_TDB			
S408	0	((smart adj technology) (smart adj technology).as.) and linq with ((meeting conference ball participant) )	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/06/20 20:24
S409	2	((smart adj technology) (smart adj technology).as.) and linq with ( (wifi wireless\$2 wire adj less\$2 radio frequency link))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/06/20 20:25
S410	2	banerjee.inv. and linq	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/06/20 20:36

#### EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S193	337,912	(driver software process method) with (generic install\$5 pre adj install\$5 windows linux osx apple operat\$3 near2 system).clm.	US-PGPUB; USPAT	OR	ON	2018/11/26 12:27
S194	173,044	(G06F\$ H04L\$ H04M\$).CPC. and (peripheral endpoint module speaker webcam web adj camera webcamera multimedia multi adj media) with (bus interface network select\$5 switch\$3).clm.	US-PGPUB; USPAT	OR	ON	2018/11/26 12:41
S195	17,887	S194 AND (driver software process method) with (generic install\$5 pre adj install\$5 windows linux osx apple operat\$3 near2 system).dm.	US-PGPUB; USPAT	OR	ON	2018/11/26 12:42
S196	12	S195 and (mass adj storage with (driver function\$5) and screen near2 scrap\$4).clm.	US-PGPUB; USPAT	OR	ON	2018/11/26 12:43
S197	71	S195 and (mass adj storage with (driver function\$5) screen near2 scrap\$4).dm.	US-PGPUB; USPAT	OR	ON	2018/11/26 12:43

S198	59	S197 NOT S196	US- PGPUB; USPAT	OR	ON	2018/11/26 12:44
S394	364,447	(driver software process method) with (generic install\$5 pre adj install\$5 windows linux osx apple operat\$3 near2 system).clm.	US- PGPUB; USPAT	OR	ON	2019/11/12 10:19
S395	184,345	(G06F\$ H04L\$ H04M\$).CPC. and (peripheral endpoint module speaker webcam web adj camera webcamera multimedia multi adj media) with (bus interface network select\$5 switch\$3).clm.	US- PGPUB; USPAT	OR	ON	2019/11/12 10:19
S396	19,077	S395 AND (driver software process method) with (generic install\$5 pre adj install\$5 windows linux osx apple operat\$3 near2 system).dm.	US- PGPUB; USPAT	OR	ON	2019/11/12 10:19
S397	12	S396 and (mass adj storage with (driver function\$5) and screen near2 scrap\$4).clm.	US- PGPUB; USPAT	OR	ON	2019/11/12 10:19
S398	72	S396 and (mass adj storage with (driver function\$5) screen near2 scrap\$4).dm.	US- PGPUB; USPAT	OR	ON	2019/11/12 10:19
S399	60	S398 NOT S397	US- PGPUB; USPAT	OR	ON	2019/11/12 10:19

10/1/2020 12:18:05 PM

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Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

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PTO/SB/08a (01-10)

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		16852790
	Filing Date		2020-04-20
	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name	BARTELS, CHRISTOPHER A.	
	Attorney Docket Number	BEEL3004C/TL	

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/C.A.B/	1	20020054044	A1	2002-05-09	Lu et al.	

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Application Number  
PageID #: 3574

16852790

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

BARTELS, CHRISTOPHER A.

Attorney Docket Number

BEEL3004C/TL

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

/C.A.B/	1	LINK SOFTWARE USER'S GUIDE, Smart Technologies Inc., Copyright 2004-2005, Version 1.0, pages 1-19.
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Examiner Signature	/CHRISTOPHER A BARTELS/	Date Considered	10/01/2020
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Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	BARTELS, CHRISTOPHER A.
Attorney Docket Number	BEEL3004C/TL

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**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

### **SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2020-06-16
Name/Print	THOMAS LEE	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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## BIB DATA SHEET

CONFIRMATION NO. 5321

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.	
16/852,790	04/20/2020	710	2184	BEEL3004C/TL	
<b>RULE</b>					
<b>APPLICANTS</b> BARCO N.V., Kortrijk, BELGIUM;					
<b>INVENTORS</b> Koen Simon Herman Beel, Eke, BELGIUM; Yoav Nir, Komen, BELGIUM; Filip Josephine Johan Louwet, Knesselare, BELGIUM; Guy Coen, Aalst, BELGIUM;					
<b>** CONTINUING DATA *****</b> This application is a CON of 14/344,836 03/03/2015 PAT 10762002 which is a 371 of PCT/EP2012/068167 09/14/2012 which claims benefit of 61/534,592 09/14/2011 and claims benefit of 61/635,234 04/18/2012 and is a CIP of 13/270,659 10/11/2011 PAT 8756348					
<b>** FOREIGN APPLICATIONS *****</b>					
<b>** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **</b> 04/23/2020					
Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Verified and /CHRISTOPHER A. BARTELS/ Acknowledged Examiner's Signature	<input type="checkbox"/> Met after Allowance Initials	<b>STATE OR COUNTRY</b> BELGIUM	<b>SHEETS DRAWINGS</b> 6	<b>TOTAL CLAIMS</b> 20	<b>INDEPENDENT CLAIMS</b> 4
<b>ADDRESS</b> BACON & THOMAS, PLLC 625 SLATERS LANE FOURTH FLOOR ALEXANDRIA, VA 22314-1176 UNITED STATES					
<b>TITLE</b> ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS					
<b>FILING FEE RECEIVED</b> 2180	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		

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**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

KOB CHRISTOPHER A. BARTELS

Attorney Docket Number

BEEL3004CTL

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Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
/C.A.B/	1	6601087		2003-07-29	Zhu et al.	
	2	7584313		2009-09-01	Hay et al.	
	3	7762470		2010-07-27	Finn et al.	
	4	8069465		2011-11-29	Bartholomay et al.	
	5	8327410		2012-12-04	Andersen et al.	
	6	8521926		2013-08-27	Hsueh et al.	
	7	8601470		2013-12-03	Yue et al.	
/C.A.B/	8	8717599		2014-05-06	Ochiai et al.	

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	
	Filing Date	
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	TBD
	Attorney Docket Number	BEEL3004CTL

/C.A.B/	9	8896656	2014-11-25	Epstein et al.
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/C.A.B/	1	20030120849		2003-06-26	Roslak et al.	
	2	20060233191		2006-10-19	Pirzada et al.	
	3	20070162661		2007-07-12	Fu et al.	
	4	20080088634		2008-04-17	Thompson et al.	
	5	20080182518		2008-07-31	Lo	
	6	20090023475		2009-01-22	Chang et al.	
	7	20090029647		2009-01-29	Wei et al.	
/C.A.B/	8	20090251621		2009-10-08	Ichieda	

Application Number  
PageID #: 3580**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	TBD
Attorney Docket Number	BEEL3004CTL

/C.A.B/	9	20100022274		2010-01-28	Roberts et al.	
	10	20100077021		2010-03-25	Hsueh et al.	
	11	20100091987		2010-04-15	Takahashi et al.	
	12	20100115145		2010-05-06	Banerjee et al.	
	13	20100154014		2010-06-17	Andersen et al.	
	14	20100297964		2010-11-25	Austin et al.	
	15	20100309896		2010-12-09	Sugiyama et al.	
	16	20110010470		2011-01-13	Hulbert et al.	
	17	20110010607		2011-01-13	Raveendran	
	18	20110038005		2011-02-17	Ochiai et al.	
/C.A.B/	19	20110210983		2011-09-01	Theimer et al.	

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		2020-04-20
	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name	TBD	
	Attorney Docket Number	BEEL3004CTL	

/C.A.B/	20	20110179182	A1	2011-07-21	VADLA RAVNAS	
	21	20050015719	A1	2005-01-20	MARCHON et al.	
	22	20090092198	A1	2011-04-21	Miyata	
	23	20050122392	A1	2005-06-09	Johansen et al.	
	24	20090300520	A1	2009-12-03	Ashutosh et al.	
	25	20120054372		2012-03-01	Chen et al.	
	26	20090189981		2009-07-30	Siann et al.	
	27	20110188391		2011-08-04	Sella et al.	
	28	20100064063		2010-03-11	Deforche et al.	
/C.A.B/	29	20110092198		2011-04-21	Miyata	

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Application Number  
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Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	TBD
Attorney Docket Number	BEEL3004CTL

Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
/C.A.B/	1	2006-185359	JP		2006-07-13	Eastman Kodak Co.	English Abstract	
	2	2009-080663	JP		2009-04-16	Brother Ind Ltd.	English Abstract	
	3	2010-263326	JP		2010-11-18	Sumitomo Electric Ind.	English Abstract	
	4	2010/008866	WO		2010-01-21	Schaaf		
	5	2008-090561	JP		2008-04-17	BROTHER IND LTD	cited in EP Search Report, English abstract & mach translation	
	6	1329055	EP		2003-07-23	SONY CORP	cited in EP Search Report, corresponds to WO 01/089156	
	7	1476242	CN		2004-02-18	SEIKO EPSON CORP	English abstract of corresponding EP 1385336, cited in CN OA	
	8	2010/105335	WO		2010-09-23	SMART TECHNOLOGIES ULC	cited in CN OA	
	9	102045864	CN		2011-05-04	NEC CASIO MOBILE COMM LTD	English abstract (Corresponds U.S. 2011/0092198), cited in CN OA	
/C.A.B/	10	101631223	CN		2011-04-20	SHANGHAI HUAPING INFORMATION TECHNOLOGY CO LTD	Cited in CN OA dated 10-10-16, English abstract	

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number			
	Filing Date		2020-04-20	
	First Named Inventor	Koen Simon Herman BEEL		
	Art Unit	2184		
	Examiner Name	TBD		
	Attorney Docket Number	BEEL3004CTL		

/C.A.B/	11	101454762	CN		2013-06-12	SMART TECHNOLOGIES ULC	Cited in CN OA dated 10-10-16, English abstract	
	12	1550996	CN		2004-12-01	SEIKO EPSON CORP	Cited in CN OA dated 10-14-16, English abstract	
	13	101965609	CN		2011-02-02	SMART TECHNOLOGIES ULC	Cited in CN OA dated 10-14-16, English abstract	
	14	1385336	EP		2004-01-28	SEIKO EPSON CORP		
	15	2013037979	WO		2013-03-21	Barco N.V.		
	16	2008165007	JP		2008-07-17	Brother Ind Ltd		×
	17	2000242257	JP		2000-09-08	Canon KK		☒
	18	102045864	CN		2011-05-04	NEC Casio Mobile Comm Ltd.	English abstract	☐
/C.A.B/	19	2010135894	WO	A1	2010-12-02	ZTE Corporation	English Abstract.	☒

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**NON-PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>
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STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	Page ID #: 3584
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	TBD
Attorney Docket Number	BEEL3004CTL

/C.A.B/	1	"Universal Serial Bus 3.0 Specification", Revision 1.0 Nov. 12, 2008.
	2	"Wireless Universal Serial Bus Specification 1.1", Revision 1.1 September 9, 2010.
	3	AUSTIN et al., "Determinants and Patterns of Control over Technology in a Computerized Meeting Room," CSCW 90 Proceedings, pp. 39-51 (Oct. 1990).
	4	ROTH, "Building Group Decision Support Rooms Using 'Off-the-Shelf' Computing Resources: Prospects and Issues," Database, pp. 21-31 (May 1993).
	5	GRAY, et al., "The User Interface in Group Decision Support Systems," Group Support Systems: New Perspectives, Ch. 10, Macmillan Publishing Company, New York (1993).
	6	Products, components, systems, and methods in public use and/or sale related to the Epson Quick Wireless Connection USB key and Quick Wireless Connection , developed by Epson (accessed July 7, 2017)
	7	Products, components, systems, and methods in public use and/or sale related to the IOGEAR GUW2015VKIT Wireless USB to VGA Adapter Kit, developed by IOGEAR (accessed July 17, 2017).
	8	Products, components, systems, and methods in public use and/or sale related to the ActionTec MyWirelessTV HDMI Transmitter, developed by ActionTec and Cavium (accessed Feb. 3, 2020).
	9	European Search Report dated August 1, 2017, for EP 16207123.
	10	European Extended Search Report dated November 3, 2016, for EP 16170760.9.
/C.A.B/	11	Chinese Office Action dated October 14, 2016, for CN 201280055744.2.

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		PageID #: 3585
Filing Date		2020-04-20
First Named Inventor	Koen Simon Herman BEEL	
Art Unit	2184	
Examiner Name	TBD	
Attorney Docket Number	BEEL3004CTL	

/C.A.B/	12	Chinese Office Action dated October 10, 2016, for CN 201280055667.0.	
	13	Final Office Action in corresponding U.S. app. 14/395,364 dated November 2, 2016.	
	14	Office Action in related U.S. app. 14/725,401 dated December 31, 2019.	
	15	Summons to attend oral proceedings in corresponding EP 12762258.7 dated December 12, 2019.	
	16	Chinese Office Action in corresponding Chinese Application No. 201280074077.2, dated September 30, 2019.	
	17	U.S. Office Action in corresponding U.S. Application No. 14/278,442, dated September 18, 2019.	
	18	Notice on Reexamination in corresponding Chinese Application No. 201280001542.X, dated June 11, 2019.	×
	19	European Office Action in corresponding European Application No. 12759440.6-1204, dated May 28, 2019.	<input type="checkbox"/>
	20	U.S. Office Action in corresponding U.S. Application No. 15/449,048, dated April 8, 2019.	<input type="checkbox"/>
	21	European Office Action in corresponding European Application No. 12775162.6-1204, dated May 21, 2019.	<input type="checkbox"/>
/C.A.B/	22	Chinese Office Action in corresponding Chinese Application No. 201280074077.2, dated March 5, 2019.	<input type="checkbox"/>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		
Filing Date		2020-04-20
First Named Inventor	Koen Simon Herman BEEL	
Art Unit	2184	
Examiner Name	TBD	
Attorney Docket Number	BEEL3004CTL	

/C.A.B/	23	European Office Action in corresponding European Application No. 16170760.9-1216, dated April 2, 2019.	<input type="checkbox"/>
	24	Non-Final Office Action in corresponding U.S. Reexamination No. 90/014,088, dated September 25, 2018.	<input type="checkbox"/>
	25	Final Office Action in corresponding U.S. Reexamination No. 90/014,087, dated January 22, 2019.	<input type="checkbox"/>
	26	Chinese Office Action in related Chinese Application No. 201280001542.X, dated January 2, 2019.	<input checked="" type="checkbox"/>
	27	<a href="https://www.infocus.com/resources/documents/User-Guides/Liteshow-3-UserGuide.pdf">https://www.infocus.com/resources/documents/User-Guides/Liteshow-3-UserGuide.pdf</a> , accessed October 3, 2018.	<input type="checkbox"/>
	28	<a href="http://esupport.epson-europe.com/ViewArticle.aspx?lng=sv-SE&amp;kbid=328038&amp;data=bOU002FRIfu7YFtMOBp2mpSKntPq1A26Wyy&amp;cl=1">http://esupport.epson-europe.com/ViewArticle.aspx?lng=sv-SE&amp;kbid=328038&amp;data=bOU002FRIfu7YFtMOBp2mpSKntPq1A26Wyy&amp;cl=1</a> , accessed July 8, 2017.	<input type="checkbox"/>
	29	SIPO Office Action in corresponding app. CN 201280074077.2 dated August 23, 2018.	<input checked="" type="checkbox"/>
	30	Office Action in corresponding app. 15/449,048 dated October 12, 2018.	<input type="checkbox"/>
	31	SIPO Office Action in corresponding app. CN 201280001542.X dated July 30, 2018.	<input checked="" type="checkbox"/>
	32	EPO Office Action in corresponding app. EP 12759440.6-1204 dated August 9, 2018.	<input type="checkbox"/>
/C.A.B/	33	EPO Office Action in corresponding app. EP 12775162.6-1204 dated August 9, 2018.	<input type="checkbox"/>

Application Number  
PageID #: 3587**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	TBD
Attorney Docket Number	BEEL3004CTL

/C.A.B./	34	Office Action in corresponding app. 14/725,401 dated September 10, 2018.	<input type="checkbox"/>
	35	Office Action in corresponding app. 90/014,087 dated September 4, 2018.	<input type="checkbox"/>
	36	Office Action in corresponding app. 16/034,846 dated October 7, 2019.	<input type="checkbox"/>
	37	Office Action in corresponding app. 14/344,830 dated September 27, 2017.	<input type="checkbox"/>
	38	Office Action in corresponding app. 14/344,830 dated October 6, 2016.	<input type="checkbox"/>
	39	Chinese Notice on Reexamination in corresponding Chinese Application No. 201280074077.2, dated March 31, 2020.	<input checked="" type="checkbox"/>
	40	European Office Action in corresponding European Application No. 12775162.6, dated April 14, 2020.	<input type="checkbox"/>
	41	Brazil Office Action in corresponding Brazil Application No. BR112014026147-4, dated April 8, 2020.	<input checked="" type="checkbox"/>
/C.A.B./	42	Brazil Office Action in corresponding Brazil Application No. BR122015022158-7, dated April 8, 2020.	<input checked="" type="checkbox"/>

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Application Number	
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	TBD
Attorney Docket Number	BEEL3004CTL

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( Not for submission under 37 CFR 1.99)

Application Number		
Filing Date		2020-04-20
First Named Inventor	Koen Simon Herman BEEL	
Art Unit	2184	
Examiner Name	TBD	
Attorney Docket Number	BEEL3004CTL	

## CERTIFICATION STATEMENT

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Name/Print	THOMAS LEE	Registration Number	66396

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	16852790
	Filing Date	2020-04-20
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	Christopher A. Bartels
	Attorney Docket Number	BEEL3004C/TL

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	Filing Date		2020-04-20
	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name	Christopher A. Bartels	
	Attorney Docket Number	BEEL3004C/TL	

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Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Christopher A. Bartels
Attorney Docket Number	BEEL3004C/TL

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**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2020-12-08
Name/Print	THOMAS LEE	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

## Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**Electronic Acknowledgement Receipt**

<b>EFS ID:</b>	41319675
<b>Application Number:</b>	16852790
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5321
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas Lee/Shelly Darrenkamp
<b>Filer Authorized By:</b>	Thomas Lee
<b>Attorney Docket Number:</b>	BEEL3004C/TL
<b>Receipt Date:</b>	08-DEC-2020
<b>Filing Date:</b>	20-APR-2020
<b>Time Stamp:</b>	11:56:35
<b>Application Type:</b>	Utility under 35 USC 111(a)

**Payment information:**

Submitted with Payment	no
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**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	EP_OA1_23Nov2020.pdf	165432	no	5
			6239cd66902edc853324ab2f165eb137311b4451		

**Warnings:**

<b>Information:</b>					
2	Information Disclosure Statement (IDS) Form (SB08)	BEEL3004C_IDS.pdf	1034361	no	4
			7da2d8879dfbf25f24ed58c49f7cd58801f7a6a7		
<b>Warnings:</b>					
<b>Information:</b>					
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<b>Total Files Size (in bytes):</b>			1199793		
<p><b>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/852,790	04/20/2020	Koen Simon Herman Beel	BEEL3004C/TL	5321
23364	7590	01/14/2021	EXAMINER	
BACON & THOMAS, PLLC			BARTELS, CHRISTOPHER A.	
625 SLATERS LANE				
FOURTH FLOOR				
ALEXANDRIA, VA 22314-1176				
			ART UNIT	PAPER NUMBER
			2184	
			NOTIFICATION DATE	DELIVERY MODE
			01/14/2021	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

MAIL@BACONTHOMAS.COM



**Office Action Summary**Application No.  
16/852,790Applicant(s)  
Beel et al.Examiner  
CHRISTOPHER A BARTELSArt Unit  
2184AIA (FITF) Status  
No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) ☒ Responsive to communication(s) filed on 04/20/2020.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_.

2a) ☐ This action is **FINAL**.

2b) ☒ This action is non-final.

3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.

4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims\***

5) ☒ Claim(s) 1-102 is/are pending in the application.

5a) Of the above claim(s) 1-81 is/are withdrawn from consideration.

6) ☐ Claim(s) \_\_\_\_ is/are allowed.

7) ☒ Claim(s) 82-102 is/are rejected.

8) ☐ Claim(s) \_\_\_\_ is/are objected to.

9) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement

\* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

**Application Papers**

10) ☐ The specification is objected to by the Examiner.

11) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a) ☐ All      b) ☐ Some\*\*      c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

3) ☐ Interview Summary (PTO-413)

Paper No(s)/Mail Date \_\_\_\_.

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)

4) ☐ Other: \_\_\_\_.

Paper No(s)/Mail Date \_\_\_\_.

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#### DETAILED ACTION

*This office action is in response to a telephone discussion with Attorney on record Mr. Thomas Lee (01/05/2021). Upon discussion with Mr. Lee indicating the wrong set of claims were examined. The Non-Final dated 10/08/2020 has been vacated. Thus, the statutory period to reply has been restarted with the corresponding claim set. Claims 82-102 are currently pending.*

#### **Notice of Pre-AIA or AIA Status**

1. The present application is being examined under the pre-AIA first to invent provisions.

#### **Claim Rejections - 35 USC § 103**

2. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

3. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained through the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claim 82-84, and 87-102 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Nuyttens et al. (USPGPUB No. 2007/0033289 A1, hereinafter referred to as Nuyttens) in view of Thompson (USPGPUB No. 2009/0247006 A1).

*Referring to claim 82, Nuyttens discloses a method for connecting a processing device* {CPU mezzanine board 47, see Fig. 8, [0116], lines 1-3} *to a communications network* {"eth 1000", see Fig. 7, [0112].}, *the processing device having a having a memory* {"flash 33", see Fig. 7.}, *a display* {Monitor coupled to graphic accelerator 44, see Fig. 8, [0117].} *and an operating system* {Windows or Linux, see Fig. 8, [0117].} *with pre-installed generic drivers providing a generic communications protocol* {PCI express to couple peripheral devices, [0116], first 4 lines, see Fig. 8.} *for communication between processing device and a class of peripheral devices* {"such as a storage device which is part of mass storage", [0252].}, *the method comprising:*

*b) communicating audio data and display data from the processing device to the external peripheral device* {"a characteristic of such a [communication] network is to... route data from one address to another", [0088].};

*c) reading the audio data from the port using an audio device on the external peripheral device* {"inserting the decoded image [and corresponding audio] on the internal bus of the [pre-installed generic audio driver] the multi-viewer driver 2", [0112].},

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Furthermore, Thompson discloses **a) coupling an external peripheral device** {external peripheral devices "NCM 104 and 106" (see Fig. 11, [0049].} **physically to a port** {"access port of a variety of network configurations", [0049].} **of the processing device, the peripheral device having a transceiver** {said nodes "104 and 106" transceiving via COAX, HDMI and ETHERNET (see Fig. 11, [0050]).} **and a connector configured to couple to the port of the processing device** {"connectors" via "packet decoder 150", see Fig. 5, [0056].};

**d) connecting the processing device to a communications network** {processing device "Gateway 200" (see Fig. 11) to a communication network "cable 113", [0062].} **via the transceiver** {said nodes "104 and 106", [0050]};

**e) display data and audio data being routed between the processing device and the communication network via the transceiver and further to a base node** {base node "gateway 200" (see Fig. 11) and displaying data to "HD TV 206" (see Fig. 1, [0026].).

Nuyttens and Thompson are analogous art because they are from the same field of endeavor, methods and systems communicating with networked peripherals.

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Nuyttens and Thompson before him or her, to modify Nuyttens' "graphics accelerator 44" incorporating Thompson's "gateway 200".

The suggestion/motivation for doing so would have been to provide a simple and flexible means for tapping various types of multimedia analog or digital transmissions carried on any installed cable without

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requiring a change in the cable type, connector or enclosure (Thompson [0027]).

Therefore, it would have been obvious to combine Thompson with Nuyttens to obtain the invention as specified in the instant claim(s).

*As per claim 83, the rejection of claim 82 is incorporated and Nuyttens discloses wherein the audio device comprises an audio output adapter device {"switching device 16 is a Gbe switch", see Fig. 4, [0102].} which is configured as a virtual audio device to transfer the audio data {"connected to the display controllers 2, Hydra multi-viewers", [0102], see Fig. 4.} from the processing device to the base node via the communications network {"network switch for the distribution of the encoded data streams", see Fig. 4, [0102].}.*

*As per claim 84, the rejection of claim 82 is incorporated and Nuyttens discloses further comprising presenting the external peripheral device to the processing device as any of the following:*

*a human interface device; a mass storage device {"such as a storage device which is part of mass storage", [0252].}; and a composite device {Examiner's interpretation: this is a Markush claim due to the word "any", thus only one element of the group to be shown by the reference to teach the claim.}.*

*As per claim 87, the rejection of claim 82 is incorporated and Nuyttens discloses wherein the external peripheral device analyzes an incoming signal from the processing device and if no audio data is*

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*received, the incoming signal is discarded and if audio data is received, the external peripheral device initiates a TCP/IP socket connection* {as a "network switch... a GbE switch", GbE refers to Gigabit Ethernet protocol includes support for both TCP and UDP streams/sockets, [0102].} *to the base unit through the communications network* {"network switch for the distribution of the encoded data streams", see Fig. 4, [0102].}.

*As per claim 88, the rejection of claim 82 is incorporated and Nuyttens discloses further comprising time-stamping synchronously a stream of the audio data with a stream of the display data* {time-stamping "Real time encoding at full frame rate... [for the data stream] in-sports events phases", [0109].}.

*As per claim 89, the rejection of claim 88 is incorporated, further comprising encoding, optionally encrypting the audio data* {encoding "the document [into] SGML, XML, SVG" and so on ([0044]), where the XML format is well-known for encrypting functionalities.}.

*As per claim 90, the rejection of claim 82 is incorporated and Nuyttens discloses wherein further comprising time-stamping synchronously the audio with the data stream* {time-stamping "Real time encoding at full frame rate... [for the data stream] in-sports events phases", [0109].}.

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*As per claim 91, the rejection of claim 90 is incorporated and Nuyttens discloses wherein further comprising encoding, optionally encrypting {encoding "the document [into] SGML, XML, SVG" and so on ([0044])}, where the XML format is well-known for encrypting functionalities.} the audio data.*

*Referring to claims 92-95, and 98-101 are system claims reciting claim language corresponding to the method claim of claims 82-84, 87-89, respectively, thereby rejected under the same rationale as claims 82-84, 87-89.*

*As per claim 96, the rejection of claim 95 is incorporated and Nuyttens discloses wherein if audio is received, the external peripheral device is adapted to initiate an additional connection as a "network switch... a GbE switch", GbE refers to Gigabit Ethernet protocol includes support for both TCP and UDP streams/sockets, [0102].} to the base unit base unit "baseboard of the multi-viewer driver 2", [0112].} through the communications network {"eth 1000", see Fig. 7, [0112].}.*

*As per claim 97, the rejection of claim 96 is incorporated and Nuyttens wherein the client application is a portable application {"X.11 windows" known for its' portability and versatility in different platforms, [0171].}.*

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*Referring to claims 102 is an apparatus claim reciting claim language corresponding to the method claim of claims 82-84, and 87-89 respectively, thereby rejected under the same rationale as claims 82-84, and 87-89.*

5. Claims 85 and 86 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nuyttens in view of Thompson and further in view of Carlson et al. (USPGPUB No. **2013/0060662 A1**, hereinafter referred to as Carlson).

*As per claim 85, the rejection of claim 82 is incorporated however neither Nuyttens nor Thompson appears to explicitly disclose any limitation in this dependent claim.*

Furthermore, Carlson discloses *wherein a client application is stored on the peripheral device which when run on the processing device obtains screen scraped data* {client application "Product catalog system 130" (see Fig. 1) obtaining screen scraped data "screen scraping mechanism", [0023].}.

Nuyttens/Thompson and Carlson are analogous art because they are from the same field of endeavor, methods and systems communicating with networked peripherals.

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Nuyttens/Thompson and Carlson before him or her, to modify Nuyttens/Thompson's device incorporating Carlson's "screen scraping mechanism".



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The suggestion/motivation for doing so would have been to provide and facilitate the creation of user interfaces that organize results to reduce cognitive load on the user (Carlson [0003], lines 4-6).

Therefore, it would have been obvious to combine Carlson with Nuyttens/Thompson to obtain the invention as specified in the instant claim(s).

***As per claim 86, the rejection of claim 85 is incorporated and Nuyttens discloses wherein the client application is a portable application*** {"standard [portable] X.11 methods can be used to feed this information to the DGU 14", [0172], [0171].}.

#### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references indicative of the current state of the art: US 20060101116 A1, and US 20070168481 A1.

#### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER A. BARTELS whose telephone number is (571)270-3182. The examiner can normally be reached on Monday-Friday 9:00a-5:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Henry Tsai can be reached on 571-272-4176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C. B./  
Examiner, Art Unit 2184

/HENRY TSAI/  
Supervisory Patent Examiner, Art Unit 2184

PageID #: 3608

<b>Notice of References Cited</b>	Application/Control No. 16/852,790	Applicant(s)/Patent Under Reexamination Beel et al.	
	Examiner CHRISTOPHER A BARTELS	Art Unit 2184	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20070033289-A1	02-2007	Nuyttens; Geert	G06F3/1446	709/230
*	B	US-20090247006-A1	10-2009	Thompson; William H.	H04L12/2898	439/527
*	C	US-20130060662-A1	03-2013	Carlson; Andy	G06Q30/06	705/26.61
*	D	US-20060101116-A1	05-2006	Rittman; Danny	H04L12/1813	709/204
*	E	US-20070168481-A1	07-2007	Lambert; Timothy	G06F13/128	709/223
	F					
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**FOREIGN PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

**NON-PATENT DOCUMENTS**


*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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	V	
	W	
	X	

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.


<b><i>Index of Claims</i></b> 	<b>Application/Control No.</b> 16/852,790	<b>Applicant(s)/Patent Under Reexamination</b> Beel et al.
	<b>Examiner</b> CHRISTOPHER A BARTELS	<b>Art Unit</b> 2184

✓	<b>Rejected</b>	-	<b>Cancelled</b>	N	<b>Non-Elected</b>	A	<b>Appeal</b>
=	<b>Allowed</b>	÷	<b>Restricted</b>	I	<b>Interference</b>	O	<b>Objected</b>


CLAIMS										
<input type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47										
CLAIM		DATE								
Final	Original	10/01/2020								
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<b><i>Index of Claims</i></b> 	<b>Application/Control No.</b> 16/852,790	<b>Applicant(s)/Patent Under Reexamination</b> Beel et al.
	<b>Examiner</b> CHRISTOPHER A BARTELS	<b>Art Unit</b> 2184

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<b><i>Search Notes</i></b> 	<b>Application/Control No.</b> 16/852,790	<b>Applicant(s)/Patent Under Reexamination</b> Beel et al.
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Search Notes		
Search Notes	Date	Examiner
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	Filing Date	2020-04-20
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	Art Unit	2184	
	Examiner Name	Christopher A. Bartels	
	Attorney Docket Number	BEEL3004C/TL	

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16852790

**INFORMATION DISCLOSURE  
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( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Christopher A. Bartels
Attorney Docket Number	BEEL3004C/TL

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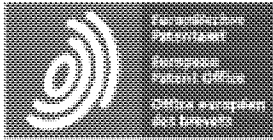
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## DESCRIPTION CN101566940A

*10* Method and device for realizing universal serial bus audio transmission of wireless data terminal

[0001]

*14* Technical field

[0002]

*18* The invention relates to audio data transmission technology, in particular to a method and device for realizing universal serial bus audio transmission of a wireless data terminal.

[0003]

*23* Background technique

[0004]

*27* At present, Time Division-Synchronous Code Division Multiple Access (TD-SCDMA, Time Division-Synchronous Code Division Multiple Access) technology, as the third-generation mobile communication standard proposed by China, has matured day by day. With the support of TD-SCDMA technology, it can download data and The speed of uploading data to the network has been greatly improved, and the increase in speed will inevitably promote the increase of users' demand for audio services and video services.

[0005]

*35* In the prior art, when processing audio data, the wireless data terminal directly sends the analog audio signal received from the air interface to the corresponding radio frequency, codec and other hardware devices for demodulation and decoding, and finally it is played by the speaker; The collected analog audio signal that

needs to be sent is encoded and modulated by the corresponding codec, radio frequency and other hardware devices and then sent out.

40 The disadvantage of this way of processing audio data is that, due to the need to encode and decode audio data, the wireless data terminal must be equipped with a corresponding codec, which increases hardware costs.

[0006]

45 To overcome the shortcomings of the aforementioned audio data processing methods, a currently popular implementation method is Universal Serial Bus Audio Transmission (VOUSB, Voice Over USB). The implementation of this method is briefly described with a widely used PC as a terminal device.

48 The wireless data terminal transmits the demodulated audio data to the PC through the USB interface for decoding and other processing; similarly, the audio data processed in the PC is transmitted to the wireless data terminal through the USB interface.

51 In this way, the wireless data terminal no longer needs a codec on the hardware, reducing the hardware cost. Moreover, compared to wireless data terminals, PCs have stronger computing power and more memory resources, so they have more powerful processing capabilities for audio data and can perform richer processing, such as: denoising, retouching, Mixing and other processing.

[0007]

59 Figure 1 is a schematic diagram of the implementation method of VOUSB in the prior art. The air interface of the wireless data terminal receives the analog audio signal sent by the remote device via the wireless communication network and transmits it to the radio frequency for demodulation. After that, the baseband processing module decodes it. The tuned audio data is amplified and digitally filtered to obtain a pulse code modulation (PCM, Pulse Code Modulation) code stream, and then transmit the PCM code stream to the USB driver on the wireless data terminal side, and the USB driver on the wireless data terminal side converts the PCM The code stream is transmitted to the USB endpoint of the wireless data terminal. Finally, in accordance with the batch transmission method of the USB standard, the PCM code stream is transmitted to the USB endpoint of the terminal device via the USB endpoint of the wireless data terminal.

67 Here, the role of the USB driver on the wireless data terminal side is to receive audio data from the baseband processing module and transmit it to the USB endpoint of the wireless data terminal, or read audio data from the USB endpoint of the wireless data terminal and transmit it to the baseband processing module. The characteristic of the USB standard batch transmission method is to support a large amount of data transmission within an uncertain time, which can guarantee that the data can be transmitted, but the transmission bandwidth and delay are not guaranteed, so the real-time performance of data transmission is not good; In addition, for the audio data transmitted in the USB standard batch transmission mode, the terminal device does not have a standard driver to process it. To process the audio data, it needs to be implemented with the help of a user interface (UI, User Interface). The process is as follows:

[0008]

79 For the PCM code stream sent by the wireless data terminal to the USB endpoint of the terminal device, the

terminal device side USB driver reads it, and the terminal device UI reads and releases it from the terminal device side USB driver. After that, the PCM code stream Transfer to a physical sound card.

82 The physical sound card decodes the transmitted PCM code stream, then obtains the analog audio signal through A/D conversion and other processing, and finally sends the analog audio signal to the speaker for playback. The physical sound card may be a sound card with a PCI interface or a USB sound card. Here, the role of the USB driver on the terminal device side is to read audio data from the USB endpoint of the terminal device and transmit it to the UI, or obtain audio data from the UI and transmit it to the USB endpoint of the terminal device.

[0009]

91 However, in the current implementation method based on VOUSB, the USB audio data transmission channel between the wireless data terminal and the terminal device is only used as the data transmission channel. The problem that this brings is that there is no special optimization for the characteristics of audio data transmission. In terms of real-time performance, it has affected the practical application of VOUSB.

[0010]

98 Summary of the invention

[0011]

102 In view of this, the main purpose of the present invention is to provide a method and device for realizing universal serial bus audio transmission of a wireless data terminal, making full use of the powerful ability of the terminal device to process audio data and enhancing the practical application effect of VOUSB.

[0012]

108 In order to achieve the above objective, the technical scheme of the present invention is achieved as follows:

[0013]

112 The invention discloses a method for realizing universal serial bus audio transmission of a wireless data terminal. The USB audio data transmission channel between the wireless data terminal and the terminal device is enumerated as a USB sound card device. The key is that the method includes the following steps:

[0014]

118 The wireless data terminal sends audio data to the terminal device through the USB sound card device, and the terminal device accesses the USB sound card device through its own audio device driver to obtain audio data; the terminal device sends audio to the USB sound card device through its own audio device driver Data, the wireless data terminal receives the audio data through the USB sound card device.

[0015]

125 The enumerating the USB audio data transmission channel between the wireless data terminal and the terminal device as a USB sound card device includes: the wireless data terminal defines the wireless data terminal USB endpoint that transmits audio data as a sound card, and sets the wireless data terminal USB The endpoint is connected to the USB endpoint of the terminal device through a USB data cable; the terminal device requests the wireless data terminal to obtain the device descriptor, configuration descriptor, and descriptor set of the connected sound card. After the wireless data terminal receives the request, it sends the device description to the terminal device According to the acquired device descriptor, configuration descriptor, and descriptor set, the terminal device determines the driver that can provide USB, loads the corresponding audio device driver that conforms to the USB specification, and the audio device driver performs the operation on the sound card Configure to get a USB sound card device.

[0016]

138 The terminal device includes an audio device driver, a user interface UI, and a physical sound card. The terminal device accesses the USB sound card device to obtain audio data through its own audio device driver, including: the audio device driver accesses the USB sound card device interface The USB sound card device reads and releases the pulse code modulation PCM code stream transmitted to the USB sound card device; the UI accesses the audio device driver through the audio device interface, and transmits the PCM code stream to the physical sound card.

[0017]

147 The terminal device includes an audio device driver, a user interface UI, and a physical sound card. The terminal device sends audio data to the USB sound card device through its own audio device driver, including: the physical sound card obtains a PCM code stream from an analog audio signal; UI Obtain the PCM code stream from the physical sound card, and transmit the PCM code stream to the audio device driver through the audio device interface of the audio device driver, and the audio device driver sends the PCM code stream to the USB sound card device.

[0018]

156 The invention also discloses a device for realizing universal serial bus audio transmission of a wireless data terminal. The device includes: a wireless data terminal, a USB sound card device and a terminal device,

[0019]

161 The wireless data terminal is used to send audio data to the terminal device through a USB sound card device, and to receive audio data from the terminal device through the USB sound card device.

[0020]

166 USB sound card device, used to transmit audio data between the wireless data terminal and the terminal device;

[0021]

171 The terminal device is used to access the USB sound card device through its own audio device driver to obtain audio data from the wireless data terminal, and send audio data to the USB sound card device through its own audio device driver.

[0022]

177 The USB sound card device includes: a wireless data terminal-side USB driver, a wireless data terminal USB endpoint, and a terminal device USB endpoint, wherein the wireless data terminal-side USB driver is connected to the baseband processing module of the wireless data terminal; the wireless data terminal The USB endpoint is connected with the USB endpoint of the terminal device through a USB data line; the USB endpoint of the terminal device is connected with the audio device driver of the terminal device.

[0023]

185 The terminal device includes an audio device driver, a user interface UI, and a physical sound card. The audio device driver is used to access the USB endpoint of the terminal device by accessing the USB sound card device interface, and the PCM code stream transmitted to the USB endpoint of the terminal device Read and release; UI is used to access the audio device driver through the audio device interface, and transmit the PCM code stream to the physical sound card; the physical sound card is used to obtain the analog audio signal from the PCM code stream.

[0024]

194 The terminal device includes an audio device driver, a user interface UI, and a physical sound card. The physical sound card is used to obtain the PCM code stream from the analog audio signal; the UI is used to obtain the PCM code stream from the physical sound card and drive the audio through the audio device. The device interface transmits the PCM code stream to the audio device driver; the audio device driver is used to send the PCM code stream to the USB endpoint of the terminal device.

[0025]

202 It can be seen that, compared with the prior art, the method and device for realizing universal serial bus audio transmission of a wireless data terminal provided by the present invention has the following characteristics and advantages:



[0026]

208 First, the USB audio data transmission channel between the wireless data terminal and the terminal device is enumerated into a USB sound card device to transmit audio data using the standard USB AUDIO CLASS defined by the USB specification, and the operating system on the widely used terminal device Both provide the implementation of audio device drivers conforming to the USB specification by default. Therefore, the audio device driver accesses the USB endpoint of the terminal device by accessing the USB sound card device interface; the audio device driver reads the audio data read from the USB endpoint And release.

[0027]

217 Secondly, using the USB standard synchronous transmission method to transmit audio data has good real-time performance, and the terminal device has a standard driver for the synchronous transmission method, that is, the audio device driver, which reads and releases the audio data of the terminal device USB endpoint. It is done in the audio device driver, and its processing priority is higher than that in the application UI. Therefore, when the terminal device system is heavily loaded, the audio data processing still has good real-time performance.

[0028]

226 Finally, the UI accesses the audio device driver through the audio device interface, and transmits the released audio data to the physical sound card.

228 Since the UI accesses the audio device driver through the audio device interface, it reduces the UI's dependence on the audio device driver; the audio device interface is a standard interface, and there is no need to pay attention to the details of the underlying audio device driver implementation, and the operating system has good portability, allowing the UI It is simpler and more reliable to implement.

[0029]

235 According to the characteristics of audio data transmission, the USB audio data transmission channel is abstracted and optimized, and the powerful ability of terminal equipment to process audio data is fully utilized to enhance the practical application effect of VOUSB.

[0030]

241 Description of the drawings

[0031]

245 Figure 1 is a schematic diagram of a method for implementing VOUSB in the prior art;

[0032]

249 Fig. 2 is a schematic diagram of abstracting the USB audio data transmission channel into a USB sound card device in the present invention;

[0033]

254 Fig. 3 is a transmission flow chart of the wireless data terminal as the audio data receiver in the present invention;

[0034]

259 Figure 4 is a transmission flow chart of the wireless data terminal as the audio data sender in the present invention;

[0035]

264 Fig. 5 is a schematic diagram of the device structure for realizing universal serial bus audio transmission of a wireless data terminal in the present invention.

[0036]

269 Detailed ways

[0037]

273 The present invention will be further described in detail below in conjunction with the drawings and specific embodiments.

[0038]

278 Figure 2 is a schematic diagram of abstracting the USB audio data transmission channel into a USB sound card device in the present invention.

280 Compared with Figure 1, in the present invention, the USB sound card application method in the USB specification is used to abstract the USB audio data transmission channel between the wireless data terminal and the terminal device into a USB sound card device.

283 The USB audio data transmission channel refers to the audio data transmission channel including the USB driver on the wireless data terminal side, the USB endpoint of the wireless data terminal, the USB endpoint of the terminal device, and the USB data line between two USB endpoints.

286 The key to abstract the USB audio data transmission channel into a USB sound card device is to enumerate the USB audio data transmission channel into a USB sound card device using the standard USB AUDIO CLASS defined by the USB specification.

289 The enumeration is achieved through the following steps: first, the wireless data terminal side defines the

wireless data terminal USB endpoint that transmits audio data as a sound card, and connects the wireless data terminal USB endpoint to the terminal device USB endpoint through a USB data cable; After that, the terminal device sends a request to the wireless data terminal to request information such as the device descriptor, configuration descriptor, descriptor set, etc. of the connected sound card; after receiving the request, the wireless data terminal sends the requested device descriptor to the terminal device , Configuration descriptors, descriptor sets and other information; then, after the terminal device obtains this information and determines the driver that can provide USB based on this information, it loads the corresponding audio device driver that conforms to the USB specification; finally, the terminal device gets various descriptions After the symbol, it is considered that the information of the connected sound card is complete, and the sound card is configured by the audio device driver. If the configuration is successful, the audio data transmission between the wireless data terminal and the terminal device can be realized.

301 At this point, the enumeration process ends, and the USB audio data transmission channel is enumerated into a USB sound card device.

303 The wireless data terminal is connected with the USB driver of the wireless data terminal side of the USB sound card device; the terminal device is connected with the USB end point of the terminal device of the USB sound card device.

[0039]

309 Different from the audio data processing capabilities of physical sound cards such as ordinary USB sound cards, and can directly send the processed audio data to the speakers for playback, the USB sound card device is characterized by the same access interface and use method as the physical sound card. To the user, it seems to be an actual physical sound card, but in fact, this USB sound card device only has the function of audio data transmission, and does not have the real audio data processing capability. If you want to process the received audio data, Need to rely on the physical sound card on the terminal device to achieve.

315 For the audio data sent by the terminal device to the wireless data terminal, the wireless data terminal will transmit to the remote device through the wireless communication network.

317 The remote device may be a wireless data terminal or terminal device.

318 If the remote device needs to process the received audio data, if the remote device is a terminal device, directly use the physical sound card on the terminal device to process the audio data and play it; if the remote device is a wireless data terminal , The received audio data is transmitted to the terminal device connected to the wireless data terminal through the USB sound card device, and the audio data is processed by the physical sound card on the terminal device and played.

[0040]

326 Since the USB audio data transmission channel between the wireless data terminal and the terminal device is enumerated into a USB sound card device using the standard USB AUDIO CLASS defined by the USB specification, the audio data transmission is realized, and the operating system on the widely used terminal device Both provide the implementation of audio device drivers that comply with the USB specification by default. Therefore, for the audio data sent by the wireless data terminal to the USB endpoint of the USB sound card device, the audio device driver accesses the terminal by accessing the USB sound card device

interface. Device USB endpoint; when accessing the terminal device USB endpoint, the audio device driver reads and releases the audio data sent to the terminal device USB endpoint. Compared with the existing audio data read and released by the application UI, The audio device driver has a higher priority for reading and releasing. Therefore, even when the terminal device system is heavily loaded, the audio data processing still has good real-time performance; in addition to the audio device driver downward access to the terminal device USB endpoint, The audio device interface can also be provided upwards. The audio device interface is a standard interface. When the UI accesses the audio device interface, there is no need to pay attention to the details of the low-level audio device driver implementation, and the operating system is portable. The UI can be accessed through the audio device interface The audio device drives and transfers the audio data to the physical sound card, which reduces the UI's dependence on the audio device drive, and makes the UI simpler and more reliable.

[0041]

346 Specifically, the process of using a USB sound card device to implement audio data transmission is shown in Figure 3 and Figure 4.

[0042]

351 Figure 3 is a transmission flow chart of a wireless data terminal as a receiver of audio data. The transmission of audio data includes the following steps:

[0043]

356 Step 301: The air interface of the wireless data terminal receives the analog audio signal sent by the remote device via the wireless communication network, and transmits it to the radio frequency and other hardware for demodulation. After that, the baseband processing module amplifies the demodulated audio data. Digital filter processing, get PCM code stream.

[0044]

363 Step 302: The PCM code stream obtained after processing is transmitted by the baseband processing module of the wireless data terminal to the USB driver of the wireless data terminal side of the USB sound card device; after that, according to the synchronous transmission mode of the USB standard, the PCM code stream passes through the USB endpoint of the wireless data terminal And the USB data line is transferred to the USB endpoint of the terminal device of the USB sound card device.

[0045]

371 Step 303: After the PCM code stream is transmitted to the terminal device USB endpoint, the audio device driver of the terminal device accesses the terminal device USB endpoint by accessing the USB sound card device interface, and reads the PCM code stream transmitted to the terminal device USB endpoint After

fetching and releasing, the UI accesses the audio device driver through the audio device interface, and transmits the PCM code stream to the physical sound card.

[0046]

379 Step 304: The physical sound card decodes the transmitted PCM code stream and processes the D/A conversion to obtain an analog audio signal. Finally, the analog audio signal is transmitted to the speaker for playback.

[0047]

385 Figure 4 is a transmission flow chart of a wireless data terminal as a sender of audio data. The transmission of audio data includes the following steps:

[0048]

390 Step 401: The microphone of the terminal device transmits the collected analog audio signal to the physical sound card, and the physical sound card performs A/D conversion, encoding and other processing on it to obtain a digital audio signal in the form of a PCM code stream.

[0049]

396 Step 402: The UI of the terminal device obtains the PCM code stream from the physical sound card, and transmits the PCM code stream to the audio device driver through the audio device interface driven by the audio device. The audio device driver compresses the PCM code stream, and then the audio device driver Return the PCM code stream to the terminal device USB endpoint of the USB sound card device by accessing the USB sound card device interface.

[0050]

404 Step 403: After the PCM code stream is transmitted to the USB endpoint of the terminal device of the USB sound card device, according to the synchronous transmission mode of the USB standard, the PCM code stream is transmitted to the wireless data terminal USB endpoint of the USB sound card device through the USB data line.

[0051]

411 Step 404: The baseband processing module of the wireless data terminal obtains the PCM code stream transmitted to the USB endpoint of the wireless data terminal through the USB driver on the wireless data terminal side, performs amplification and digital filtering, and modulates by radio frequency to obtain an analog audio signal. Finally, The air interface is sent to the remote device via the wireless communication network.

[0052]

419 In order to realize the above method, the present invention also provides a device for realizing universal serial bus audio transmission of a wireless data terminal. As shown in FIG. 5, the device is mainly composed of a wireless data terminal, a USB sound card device, and a terminal device.

[0053]

425 Among them, the wireless data terminal is used to send audio data to the terminal device through a USB sound card device; to receive audio data from the terminal device through the USB sound card device.

[0054]

430 USB sound card device, used to transmit audio data between the wireless data terminal and the terminal device.

[0055]

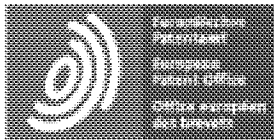
435 The terminal device is used to access the USB sound card device through its own audio device driver to obtain audio data from the wireless data terminal, and send audio data to the USB sound card device through its own audio device driver.

[0056]

441 Specifically, the audio device driver of the terminal device accesses the USB endpoint of the terminal device by accessing the USB sound card device interface, reads and releases the audio data transmitted to the USB endpoint of the terminal device, and then further transmits the audio data to The physical sound card is decoded, D/A converted, and finally played by the speaker; the audio data collected by the microphone, and further A/D converted and encoded by the physical sound card, is transmitted by the UI to the audio device driver for compression, and then the audio device The driver returns to the terminal device USB endpoint by accessing the USB sound card device interface.

[0057]

451 The foregoing descriptions are only preferred embodiments of the present invention, and are not used to limit the protection scope of the present invention.



# Patent Translate

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## CLAIMS CN101566940A

1.

- 13 1. A method for realizing universal serial bus audio transmission of a wireless data terminal is characterized in that the USB audio data transmission channel between the wireless data terminal and the terminal device is enumerated as a USB sound card device, and the method includes the following steps:
- 16 The wireless data terminal sends audio data to the terminal device through the USB sound card device, and the terminal device accesses the USB sound card device through its own audio device driver to obtain the audio data;
- 19 The terminal device sends audio data to the USB sound card device through its own audio device driver, and the wireless data terminal receives the audio data through the USB sound card device.

2.

- 24 2. The method according to claim 1, wherein the enumerating USB audio data transmission channels between the wireless data terminal and the terminal device as a USB sound card device comprises:
- 26 The wireless data terminal defines the wireless data terminal USB endpoint that transmits audio data as a sound card, and connects the wireless data terminal USB endpoint to the terminal device USB endpoint through a USB data cable;
- 29 The terminal device requests the wireless data terminal to obtain the device descriptor, configuration descriptor, and descriptor set of the connected sound card. After receiving the request, the wireless data terminal sends the device descriptor, configuration descriptor, and descriptor set to the terminal device;
- 32 The terminal device determines the driver that can provide USB according to the acquired device descriptor, configuration descriptor, and descriptor set, loads the corresponding audio device driver that conforms to the USB specification, and configures the sound card by the audio device driver to obtain the USB sound card device.



3.

39 3. The method according to claim 1, wherein the terminal device includes an audio device driver, a user interface UI and a physical sound card,

41 The terminal device accesses the USB sound card device through its own audio device driver to obtain audio data, including: the audio device driver accesses the USB sound card device by accessing the USB sound card device interface, and modulates the PCM code transmitted to the USB sound card device by pulse code The stream is read and released; the UI accesses the audio device driver through the audio device interface, and transmits the PCM code stream to the physical sound card.

4.

49 4. The method according to claim 1, wherein the terminal device includes an audio device driver, a user interface UI and a physical sound card,

51 The terminal device sends audio data to the USB sound card device through its own audio device driver, including: the physical sound card obtains the PCM code stream from the analog audio signal; the UI obtains the PCM code stream from the physical sound card and uses the audio device interface driven by the audio device The PCM code stream is transmitted to the audio device driver, and the audio device driver sends the PCM code stream to the USB sound card device.

5.

59 5. A device for realizing universal serial bus audio transmission of a wireless data terminal, characterized in that the device includes: a wireless data terminal, a USB sound card device and a terminal device,

61 The wireless data terminal is used to send audio data to the terminal device through a USB sound card device, and to receive audio data from the terminal device through the USB sound card device.

63 USB sound card device, used to transmit audio data between the wireless data terminal and the terminal device;

64 The terminal device is used to access the USB sound card device through its own audio device driver to obtain audio data from the wireless data terminal, and send audio data to the USB sound card device through its own audio device driver.

6.

70 6. The device according to claim 5, wherein the USB sound card device comprises: a USB driver on the side of a wireless data terminal, a USB endpoint of a wireless data terminal, and a USB endpoint of a terminal device,

73 The USB driver on the side of the wireless data terminal is connected to the baseband processing module of the wireless data terminal;

75 The USB endpoint of the wireless data terminal is connected to the USB endpoint of the terminal device through a USB data cable;

77 The USB endpoint of the terminal device is connected with the audio device driver of the terminal device.



7.

- 81 7. The apparatus according to claim 6, wherein the terminal device comprises an audio device driver, a user  
interface UI and a physical sound card,
- 83 The audio device driver is used to access the USB endpoint of the terminal device by accessing the USB sound  
card device interface, and read and release the PCM code stream transmitted to the USB endpoint of the  
terminal device;
- 86 UI is used to access the audio device driver through the audio device interface, and transmit the PCM code  
stream to the physical sound card;
- 88 The physical sound card is used to obtain the analog audio signal from the PCM code stream.

8.

- 92 8. The method according to claim 6, wherein the terminal device includes an audio device driver, a user  
interface UI and a physical sound card,
- 94 The physical sound card is used to obtain the PCM code stream from the analog audio signal;
- 95 The UI is used to obtain the PCM code stream from the physical sound card, and transmit the PCM code  
stream to the audio device driver through the audio device interface of the audio device driver;
- 97 The audio device driver is used to send a PCM code stream to the USB endpoint of the terminal device.

[19] 中华人民共和国国家知识产权局

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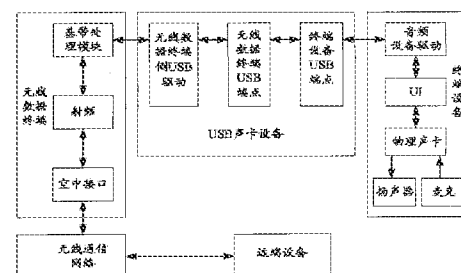
权利要求书 3 页 说明书 9 页 附图 3 页

[54] 发明名称

实现无线数据终端通用串行总线音频传输的方法及装置

[57] 摘要

本发明公开了一种实现无线数据终端通用串行总线音频传输的方法及装置。其方法为将无线数据终端与终端设备之间的 USB 音频数据传输通道, 采用 USB 规范定义的标准的 USB AUDIO CLASS 枚举成一个 USB 声卡设备, 传输音频数据; 该装置包括无线数据终端、USB 声卡设备、终端设备。所述 USB 声卡设备仅传输音频数据, 而不对音频数据进行处理; 终端设备的音频设备驱动以访问 USB 声卡设备接口的方式访问终端设备 USB 端点, 并对音频数据 PCM 码流进行读取和释放, 或者, 压缩和回传; 终端设备的物理声卡对音频数据 PCM 码流进行编解码及 D/A 或 A/D 转换。采用本发明的方法及装置, 对 USB 音频数据传输通道进行专门优化, 充分利用终端设备处理音频数据的强大能力, 增强了 VOUSB 的实际应用效果。



1、一种实现无线数据终端通用串行总线音频传输的方法，其特征在于，将无线数据终端和终端设备之间的 USB 音频数据传输通道枚举为 USB 声卡设备，该方法包括以下步骤：

无线数据终端通过所述 USB 声卡设备向终端设备发送音频数据，终端设备通过自身的音频设备驱动访问所述 USB 声卡设备获取音频数据；

终端设备通过自身的音频设备驱动向所述 USB 声卡设备发送音频数据，无线数据终端通过所述 USB 声卡设备接收该音频数据。

2、根据权利要求 1 所述的方法，其特征在于，所述将无线数据终端和终端设备之间的 USB 音频数据传输通道枚举为 USB 声卡设备，包括：

无线数据终端将传输音频数据的无线数据终端 USB 端点定义为声卡，并将该无线数据终端 USB 端点通过 USB 数据线连接到终端设备 USB 端点；

终端设备向无线数据终端请求获取所连接声卡的设备描述符、配置描述符、描述符集合，无线数据终端收到请求后，向终端设备发送设备描述符、配置描述符、描述符集合；

终端设备根据获取的设备描述符、配置描述符、描述符集合确定能够提供 USB 的驱动，加载相应符合 USB 规范的音频设备驱动，由音频设备驱动对声卡进行配置，得到 USB 声卡设备。

3、根据权利要求 1 所述的方法，其特征在于，所述终端设备包括音频设备驱动、用户界面 UI 和物理声卡，

所述终端设备通过自身的音频设备驱动访问 USB 声卡设备获取音频数据，包括：音频设备驱动以访问 USB 声卡设备接口的方式访问所述 USB 声卡设备，对传输到 USB 声卡设备的脉冲编码调制 PCM 码流进行读取和释放；UI 通过音频设备接口访问音频设备驱动，将 PCM 码流传输到物理声卡。

4、根据权利要求 1 所述的方法，其特征在于，所述终端设备包括音频设备驱动、用户界面 UI 和物理声卡，

所述终端设备通过自身的音频设备驱动向 USB 声卡设备发送音频数据, 包括: 物理声卡由模拟音频信号得到 PCM 码流; UI 从物理声卡获取该 PCM 码流, 并通过音频设备驱动的音频设备接口将 PCM 码流传输到音频设备驱动, 音频设备驱动向 USB 声卡设备发送 PCM 码流。

5、一种实现无线数据终端通用串行总线音频传输的装置, 其特征在于, 该装置包括: 无线数据终端、USB 声卡设备和终端设备,

无线数据终端, 用于通过 USB 声卡设备向终端设备发送音频数据, 通过 USB 声卡设备接收来自终端设备的音频数据。

USB 声卡设备, 用于在无线数据终端和终端设备之间传输音频数据;

终端设备, 用于通过自身的音频设备驱动访问 USB 声卡设备获取来自无线数据终端的音频数据, 通过自身的音频设备驱动向 USB 声卡设备发送音频数据。

6、根据权利要求 5 所述的装置, 其特征在于, 所述 USB 声卡设备包括: 无线数据终端侧 USB 驱动、无线数据终端 USB 端点和终端设备 USB 端点,

所述无线数据终端侧 USB 驱动与无线数据终端的基带处理模块相连;

所述无线数据终端 USB 端点通过 USB 数据线与终端设备 USB 端点相连;

所述终端设备 USB 端点与终端设备的音频设备驱动相连。

7、根据权利要求 6 所述的装置, 其特征在于, 所述终端设备包括音频设备驱动、用户界面 UI 和物理声卡,

音频设备驱动用于以访问 USB 声卡设备接口的方式访问所述终端设备 USB 端点, 对传输到终端设备 USB 端点的 PCM 码流进行读取和释放;

UI 用于通过音频设备接口访问音频设备驱动, 将 PCM 码流传输到物理声卡;

物理声卡用于由 PCM 码流得到模拟音频信号。

8、根据权利要求 6 所述的方法, 其特征在于, 所述终端设备包括音频设备驱动、用户界面 UI 和物理声卡,

物理声卡用于由模拟音频信号得到 PCM 码流;

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UI 用于从物理声卡获取该 PCM 码流，并通过音频设备驱动的音频设备接口将 PCM 码流传输到音频设备驱动；

音频设备驱动用于向所述终端设备 USB 端点发送 PCM 码流。

## 实现无线数据终端通用串行总线音频传输的方法及装置

### 技术领域

本发明涉及音频数据传输技术，具体涉及一种实现无线数据终端通用串行总线音频传输的方法及装置。

### 背景技术

目前，时分同步的码分多址（TD-SCDMA，Time Division-Synchronous Code Division Multiple Access）技术作为中国提出的第三代移动通信标准已经日趋成熟，在 TD-SCDMA 技术支持下，从网络下载数据和向网络上传数据的速度都得到了极大的提高，而速度的提高又必然会促进用户对音频业务和视频业务需求的增加。

现有技术中，无线数据终端在处理音频数据时，对从空口接收到的模拟音频信号，直接送到相应的射频、编解码器等硬件设备进行解调、解码，最后由扬声器播放；对麦克采集的需要发送的模拟音频信号，在相应的编解码器、射频等硬件设备进行编码、调制后发送出去。这种处理音频数据的方式存在的缺陷在于，由于需要对音频数据进行编码和解码，无线数据终端就必须配有相应的编解码器，增加了硬件成本。

为克服上述音频数据处理方式存在的缺陷，目前比较流行的实现方法是通用串行总线音频传输（VOUSB，Voice Over USB），以广泛应用的 PC 作为终端设备对该方法的实现作简单说明。无线数据终端将解调后的音频数据通过 USB 接口传输到 PC 进行解码等处理；类似的，将在 PC 中完成编码等处理的音频数据通过 USB 接口传输到无线数据终端。这样无线数据终端在硬件上就不再需要编解码器，降低了硬件成本。而且，相比于无线数据终端，PC 具有更强的计算能力和更多的内存资源，因此对音频数据具有更强大的处理能力，能够进行更

加丰富的处理，如：可进行去噪、润饰、混音等处理。

图 1 为现有技术中 VOUSB 的实现方法示意图，无线数据终端的空中接口接收远端设备经无线通信网络发来的模拟音频信号，并传输到射频进行解调，之后，由基带处理模块对解调后的音频数据进行放大和数字滤波处理，得到脉冲编码调制（PCM，Pulse Code Modulation）码流，再将 PCM 码流传输到无线数据终端侧 USB 驱动，由该无线数据终端侧 USB 驱动将 PCM 码流传输到无线数据终端的 USB 端点，最后，按照 USB 标准的批量传输方式，PCM 码流经无线数据终端的 USB 端点传输到终端设备的 USB 端点。这里，无线数据终端侧 USB 驱动的作用是从基带处理模块接收音频数据并传输到无线数据终端的 USB 端点，或从无线数据终端的 USB 端点读出音频数据并传输到基带处理模块。所述 USB 标准的批量传输方式的特点是支持在不确定的时间内进行大量的数据传输，能保证数据一定可以传输，但不保证传输的带宽和延时，因此数据传输的实时性不好；另外，对于以 USB 标准的批量传输方式传输的音频数据，终端设备没有标准驱动对其进行处理，若要对该音频数据进行处理，需要借助于用户界面（UI，User Interface）来实现，其实现过程如下：

对无线数据终端发送到终端设备的 USB 端点的 PCM 码流，终端设备侧 USB 驱动将其读出，并进一步由终端设备的 UI 从终端设备侧 USB 驱动读取并释放，之后，将 PCM 码流传输到物理声卡。物理声卡对传输来的 PCM 码流进行解码，再经 A/D 转换等处理得到模拟音频信号，最后将模拟音频信号送扬声器播放。所述物理声卡可以为 PCI 接口的声卡或 USB 声卡等。这里，终端设备侧 USB 驱动的作用是从终端设备 USB 端点读出音频数据传输到 UI，或从 UI 获取音频数据传输到终端设备的 USB 端点。

但目前基于 VOUSB 的实现方法中，对无线数据终端和终端设备之间的 USB 音频数据传输通道仅仅是作为数据的传输通道，这样带来的问题是没有针对音频数据传输的特点做专门的优化，在实时性等方面影响了 VOUSB 的实际应用效果。



## 发明内容

有鉴于此，本发明的主要目的在于提供一种实现无线数据终端通用串行总线音频传输的方法及装置，充分利用终端设备处理音频数据的强大能力，增强 VOUSB 的实际应用效果。

为达到上述目的，本发明的技术方案是这样实现的：

本发明公开了一种实现无线数据终端通用串行总线音频传输的方法，将无线数据终端和终端设备之间的 USB 音频数据传输通道枚举为 USB 声卡设备，关键是该方法包括以下步骤：

无线数据终端通过所述 USB 声卡设备向终端设备发送音频数据，终端设备通过自身的音频设备驱动访问所述 USB 声卡设备获取音频数据；终端设备通过自身的音频设备驱动向所述 USB 声卡设备发送音频数据，无线数据终端通过所述 USB 声卡设备接收该音频数据。

所述将无线数据终端和终端设备之间的 USB 音频数据传输通道枚举为 USB 声卡设备，包括：无线数据终端将传输音频数据的无线数据终端 USB 端点定义为声卡，并将该无线数据终端 USB 端点通过 USB 数据线连接到终端设备 USB 端点；终端设备向无线数据终端请求获取所连接声卡的设备描述符、配置描述符、描述符集合，无线数据终端收到请求后，向终端设备发送设备描述符、配置描述符、描述符集合；终端设备根据获取的设备描述符、配置描述符、描述符集合确定能够提供 USB 的驱动，加载相应符合 USB 规范的音频设备驱动，由音频设备驱动对声卡进行配置，得到 USB 声卡设备。

所述终端设备包括音频设备驱动、用户界面 UI 和物理声卡，其中，所述终端设备通过自身的音频设备驱动访问 USB 声卡设备获取音频数据，包括：音频设备驱动以访问 USB 声卡设备接口的方式访问所述 USB 声卡设备，对传输到 USB 声卡设备的脉冲编码调制 PCM 码流进行读取和释放；UI 通过音频设备接口访问音频设备驱动，将 PCM 码流传输到物理声卡。

所述终端设备包括音频设备驱动、用户界面 UI 和物理声卡，其中，所述终



端设备通过自身的音频设备驱动向 USB 声卡设备发送音频数据, 包括: 物理声卡由模拟音频信号得到 PCM 码流; UI 从物理声卡获取该 PCM 码流, 并通过音频设备驱动的音频设备接口将 PCM 码流传输到音频设备驱动, 音频设备驱动向 USB 声卡设备发送 PCM 码流。

本发明还公开了一种实现无线数据终端通用串行总线音频传输的装置, 该装置包括: 无线数据终端、USB 声卡设备和终端设备,

无线数据终端, 用于通过 USB 声卡设备向终端设备发送音频数据, 通过 USB 声卡设备接收来自终端设备的音频数据。

USB 声卡设备, 用于在无线数据终端和终端设备之间传输音频数据;

终端设备, 用于通过自身的音频设备驱动访问 USB 声卡设备获取来自无线数据终端的音频数据, 通过自身的音频设备驱动向 USB 声卡设备发送音频数据。

所述 USB 声卡设备包括: 无线数据终端侧 USB 驱动、无线数据终端 USB 端点和终端设备 USB 端点, 其中, 所述无线数据终端侧 USB 驱动与无线数据终端的基带处理模块相连; 所述无线数据终端 USB 端点通过 USB 数据线与终端设备 USB 端点相连; 所述终端设备 USB 端点与终端设备的音频设备驱动相连。

所述终端设备包括音频设备驱动、用户界面 UI 和物理声卡, 其中, 音频设备驱动用于以访问 USB 声卡设备接口的方式访问所述终端设备 USB 端点, 对传输到终端设备 USB 端点的 PCM 码流进行读取和释放; UI 用于通过音频设备接口访问音频设备驱动, 将 PCM 码流传输到物理声卡; 物理声卡用于由 PCM 码流得到模拟音频信号。

所述终端设备包括音频设备驱动、用户界面 UI 和物理声卡, 其中, 物理声卡用于由模拟音频信号得到 PCM 码流; UI 用于从物理声卡获取该 PCM 码流, 并通过音频设备驱动的音频设备接口将 PCM 码流传输到音频设备驱动; 音频设备驱动用于向所述终端设备 USB 端点发送 PCM 码流。

由此可见, 相比现有技术而言, 本发明所提供的一种实现无线数据终端通

用串行总线音频传输的方法及装置具有下述特点和优点：

首先，将无线数据终端和终端设备之间的 USB 音频数据传输通道，采用 USB 规范定义的标准的 USB AUDIO CLASS 枚举成一个 USB 声卡设备来传输音频数据，而广泛使用的终端设备上的操作系统都默认的提供了符合 USB 规范的音频设备驱动的实现，因此，音频设备驱动以访问 USB 声卡设备接口的方式访问终端设备的 USB 端点；音频设备驱动对从 USB 端点读取的音频数据进行读取和释放。

其次，采用 USB 标准的同步传输方式传输音频数据具有好的实时性，且终端设备具有针对该同步传输方式的标准驱动，即音频设备驱动，对终端设备 USB 端点的音频数据的读取和释放都是在音频设备驱动中完成，其处理优先级高于在应用程序 UI 中处理，因此，在终端设备系统负载很重的时候，音频数据的处理依然有很好的实时性。

最后，UI 通过音频设备接口来访问音频设备驱动，将完成释放的音频数据传输到物理声卡。由于 UI 是通过音频设备接口来访问音频设备驱动，减少了 UI 对音频设备驱动的依赖；音频设备接口是标准接口，不用关注底层音频设备驱动实现的细节，且操作系统可移植性好，让 UI 实现起来更加简单、可靠。

针对音频数据传输的特点，对 USB 音频数据传输通道进行抽象和优化，充分利用终端设备处理音频数据的强大能力，增强 VOUSB 的实际应用效果。

#### 附图说明

图 1 为现有技术中 VOUSB 的实现方法示意图；

图 2 为本发明中将 USB 音频数据传输通道抽象成 USB 声卡设备的示意图；

图 3 为本发明中无线数据终端作为音频数据接收方的传输流程图；

图 4 为本发明中无线数据终端作为音频数据发送方的传输流程图；

图 5 为本发明中实现无线数据终端通用串行总线音频传输的装置结构示意图。

## 具体实施方式

下面结合附图及具体实施例对本发明再作进一步的说明。

图2为本发明中将USB音频数据传输通道抽象成USB声卡设备的示意图。对比图1，本发明中，借用USB规范中USB声卡应用方法将无线数据终端与终端设备之间的USB音频数据传输通道抽象成一个USB声卡设备。所述USB音频数据传输通道指：无线数据终端侧USB驱动、无线数据终端的USB端点、终端设备的USB端点、以及两个USB端点之间的USB数据线在内的音频数据传输通道。实现USB音频数据传输通道抽象成一个USB声卡设备的关键在于，将USB音频数据传输通道，采用USB规范定义的标准的USB AUDIO CLASS枚举成一个USB声卡设备。所述枚举通过以下步骤来实现：首先，无线数据终端侧将传输音频数据的无线数据终端USB端点定义为一个声卡，并将该无线数据终端USB端点通过USB数据线连接到终端设备USB端点；之后，终端设备向无线数据终端发送请求，请求获取所连接声卡的设备描述符、配置描述符、描述符集合等信息；无线数据终端在收到请求后，向终端设备发送所请求的设备描述符、配置描述符、描述符集合等信息；然后，终端设备在获取这些信息并根据这些信息确定能够提供USB的驱动以后，加载相应符合USB规范的音频设备驱动；最后，终端设备在得到各种描述符之后，认为所连接的声卡的信息已经齐全，便由音频设备驱动对声卡进行配置，配置成功即可实现无线数据终端与终端设备之间的音频数据传输。至此，枚举过程结束，实现了将USB音频数据传输通道枚举成USB声卡设备。无线数据终端与USB声卡设备的无线数据终端侧USB驱动相连接；终端设备与USB声卡设备的终端设备USB端点相连接。

不同于通常的USB声卡等物理声卡所具有的音频数据处理能力，且可将处理后的音频数据直接送到扬声器播放，该USB声卡设备的特点是具有和物理声卡一样的访问接口和使用方法，对用户来说就好像是一个实际的物理声卡，但实际上，这个USB声卡设备只具有音频数据传输功能，而没有真实的音频数

据处理能力，如果还要对收到的音频数据进行处理，就需要借助于终端设备上的物理声卡来实现。对于终端设备发送到无线数据终端的音频数据，无线数据终端将通过无线通信网络传输到远端设备。所述远端设备可以为无线数据终端或终端设备。如果远端设备还要对收到的音频数据进行处理，对于远端设备是终端设备的情况，直接借助该终端设备上的物理声卡处理音频数据后播放；对于远端设备是无线数据终端的情况，将接收到的音频数据传输到和该无线数据终端通过 USB 声卡设备相连的终端设备，借助于该终端设备上的物理声卡处理音频数据后播放。

由于将无线数据终端和终端设备之间的 USB 音频数据传输通道，采用 USB 规范定义的标准 USB AUDIO CLASS 枚举成一个 USB 声卡设备，实现音频数据传输，而广泛使用的终端设备上的操作系统都默认提供了符合 USB 规范的音频设备驱动的实现，因此，对于由无线数据终端发送到 USB 声卡设备的终端设备 USB 端点的音频数据，音频设备驱动以访问 USB 声卡设备接口的方式访问该终端设备 USB 端点；音频设备驱动在访问终端设备 USB 端点时，对发送到该终端设备 USB 端点的音频数据进行读取和释放，相比于现有的由应用程序 UI 读取和释放音频数据，由音频设备驱动进行读取和释放优先级更高，因此，即使在终端设备系统负载很重的时候，音频数据的处理依然具有很好的实时性；音频设备驱动除了向下访问终端设备 USB 端点，向上还可提供音频设备接口，该音频设备接口是标准接口，UI 访问该音频设备接口时，不用关注低层的音频设备驱动实现的细节，且操作系统可移植性好，UI 可通过音频设备接口访问音频设备驱动并将音频数据传送到物理声卡，减少了 UI 对音频设备驱动的依赖，使 UI 实现起来更加简单、可靠。

具体的，利用 USB 声卡设备实现音频数据传输的过程如图 3、图 4 所示。

图 3 为无线数据终端作为音频数据接收方的传输流程图，音频数据的传输包括以下步骤：

步骤 301：无线数据终端的空中接口接收远端设备经无线通信网络发来的模拟音频信号，并传送到射频等硬件进行解调，之后，由基带处理模块对解调

后的音频数据进行放大和数字滤波处理，得到 PCM 码流。

步骤 302：处理后得到的 PCM 码流由无线数据终端的基带处理模块传输到 USB 声卡设备的无线数据终端侧 USB 驱动；之后，按照 USB 标准的同步传输方式，PCM 码流经无线数据终端 USB 端点和 USB 数据线被传输到 USB 声卡设备的终端设备 USB 端点。

步骤 303：在 PCM 码流传输到终端设备 USB 端点之后，终端设备的音频设备驱动以访问 USB 声卡设备接口的方式访问该终端设备 USB 端点，并对传输到终端设备 USB 端点的 PCM 码流进行读取和释放，之后，UI 通过音频设备接口访问音频设备驱动，将 PCM 码流传输到物理声卡。

步骤 304：物理声卡对传送来的 PCM 码流进行解码、D/A 转换等处理后得到模拟音频信号，最后，将该模拟音频信号传输到扬声器播放。

图 4 为无线数据终端作为音频数据发送方的传输流程图，音频数据的传输包括以下步骤：

步骤 401：终端设备的麦克将采集的模拟音频信号传送到物理声卡，由物理声卡对其进行 A/D 转换、编码等处理，得到 PCM 码流形式的数字音频信号。

步骤 402：终端设备的 UI 从物理声卡获取 PCM 码流，并通过音频设备驱动的音频设备接口将 PCM 码流传输到音频设备驱动，由音频设备驱动对 PCM 码流进行压缩，之后，音频设备驱动以访问 USB 声卡设备接口的方式将 PCM 码流回传到 USB 声卡设备的终端设备 USB 端点。

步骤 403：在 PCM 码流传输到 USB 声卡设备的终端设备 USB 端点之后，按照 USB 标准的同步传输方式，PCM 码流经 USB 数据线传输到 USB 声卡设备的无线数据终端 USB 端点。

步骤 404：无线数据终端的基带处理模块通过无线数据终端侧 USB 驱动获取传输到无线数据终端 USB 端点的 PCM 码流，进行放大和数字滤波处理，再经射频进行调制，得到模拟音频信号，最后，由空中接口经无线通信网络发送到远端设备。

为实现上述方法，本发明还提供一种实现无线数据终端通用串行总线音频

传输的装置，如图 5 所示，该装置主要由无线数据终端、USB 声卡设备、以及终端设备组成。

其中，无线数据终端，用于通过 USB 声卡设备向终端设备发送音频数据；通过 USB 声卡设备接收来自终端设备的音频数据。

USB 声卡设备，用于在无线数据终端和终端设备之间传输音频数据。

终端设备，用于通过自身的音频设备驱动访问 USB 声卡设备获取来自无线数据终端的音频数据，通过自身的音频设备驱动向 USB 声卡设备发送音频数据。

具体的，终端设备的音频设备驱动以访问 USB 声卡设备接口的方式访问终端设备 USB 端点，对传输到该终端设备 USB 端点的音频数据进行读取和释放，之后，进一步由 UI 将音频数据传输到物理声卡进行解码、D/A 转换，最后由扬声器播放；对麦克采集，并进一步由物理声卡进行 A/D 转换、编码的音频数据，由 UI 传输到音频设备驱动进行压缩，之后，由音频设备驱动以访问 USB 声卡设备接口的方式回传到终端设备 USB 端点。

以上所述，仅为本发明的较佳实施例而已，并非用于限定本发明的保护范围。



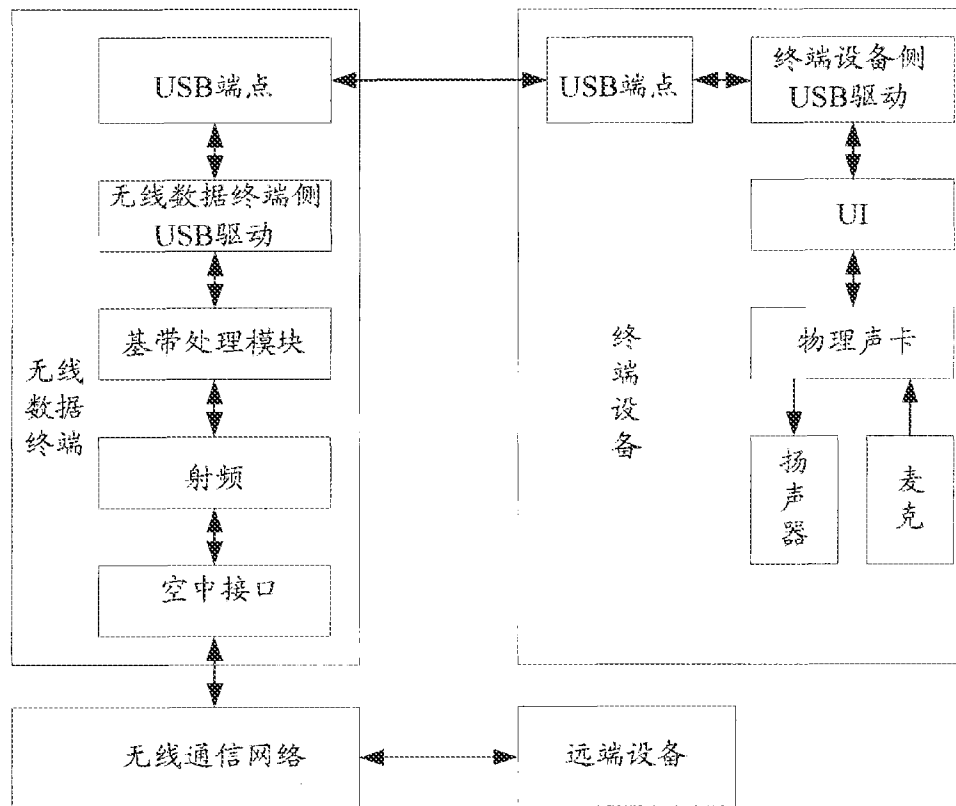


图 1

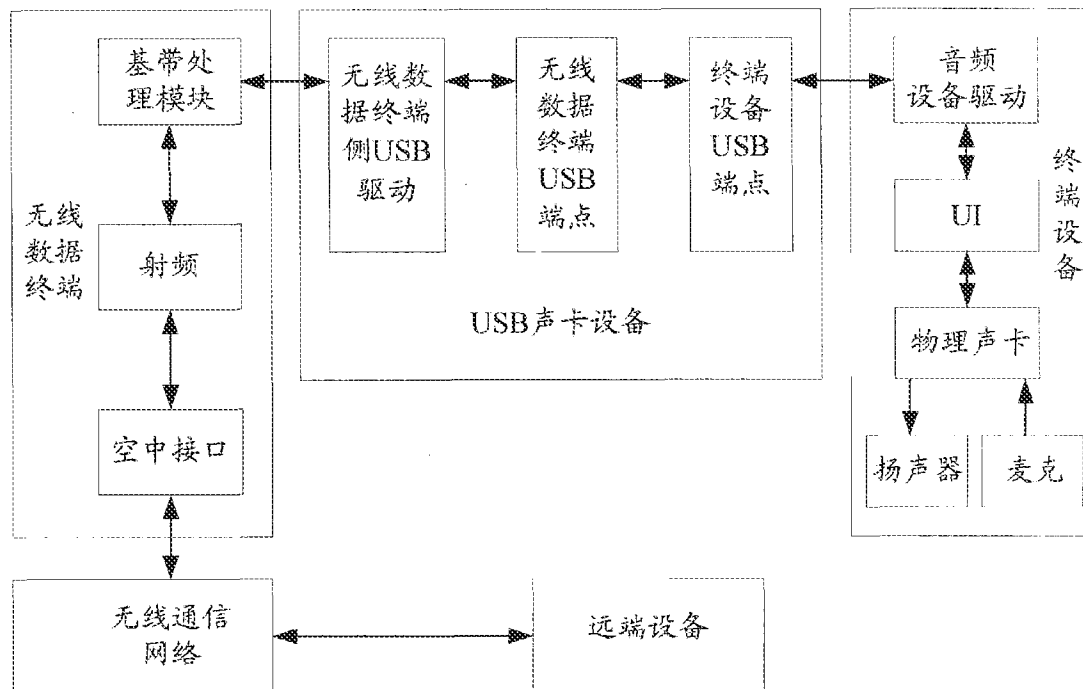


图 2

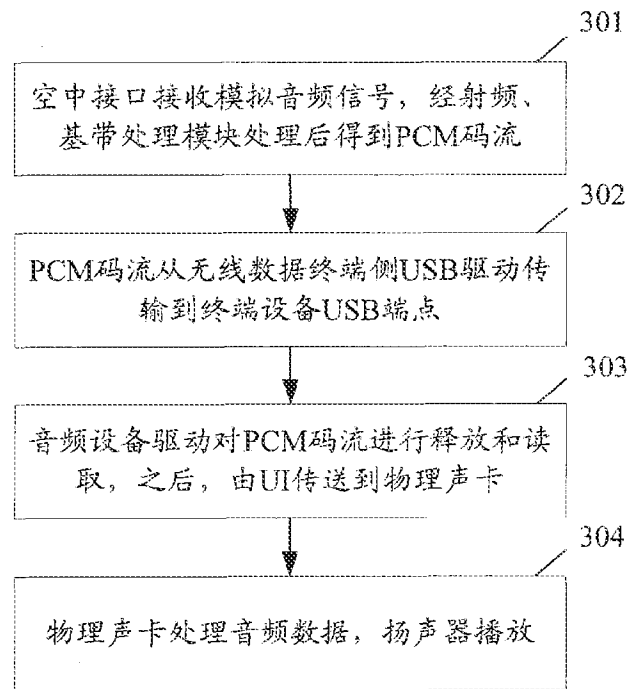


图 3

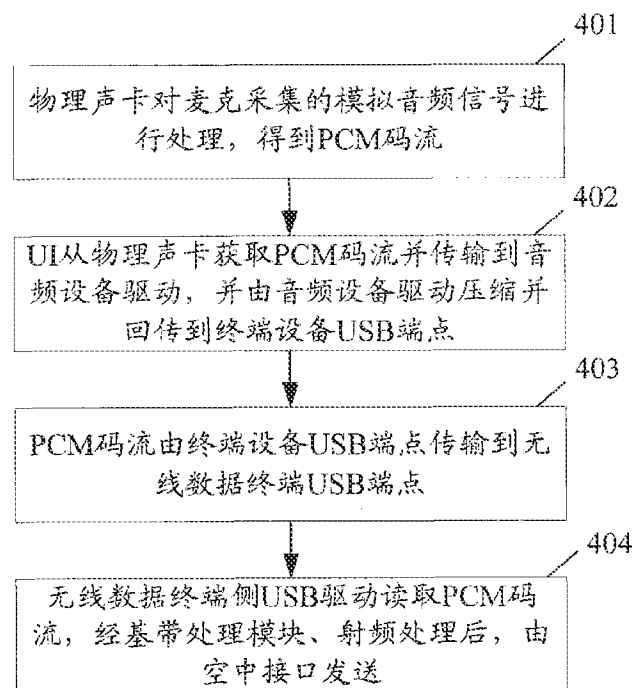


图 4



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说明书附图 第3/3页

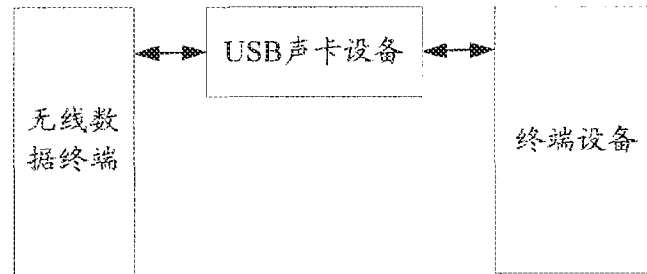


图 5

**Electronic Acknowledgement Receipt**

<b>EFS ID:</b>	41772772
<b>Application Number:</b>	16852790
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<b>Confirmation Number:</b>	5321
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas Lee/Shelly Darrenkamp
<b>Filer Authorized By:</b>	Thomas Lee
<b>Attorney Docket Number:</b>	BEEL3004C/TL
<b>Receipt Date:</b>	28-JAN-2021
<b>Filing Date:</b>	20-APR-2020
<b>Time Stamp:</b>	15:51:13
<b>Application Type:</b>	Utility under 35 USC 111(a)

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2	Non Patent Literature	CN_OA2_officialnotice_8Jan2021_with_translation.pdf	1300514	no	16
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**Warnings:****Information:**

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Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (02-18)

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	16852790
	Filing Date	2020-04-20
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	Christopher A. Bartels
	Attorney Docket Number	BEEL3004C/TL

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	16852790
	Filing Date	2020-04-20
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	Christopher A. Bartels
	Attorney Docket Number	BEEL3004C/TL

1	U.S. Office Action in corresponding U.S. Application No. 16/812,755, dated February 19, 2021.
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<p><sup>1</sup> See Kind Codes of USPTO Patent Documents at <a href="http://www.USPTO.GOV">www.USPTO.GOV</a> or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.</p>	

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	Examiner Name	Christopher A. Bartels
	Attorney Docket Number	BEEL3004C/TL

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Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2021-03-10
Name/Print	THOMAS LEE	Registration Number	66396

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<b>EFS ID:</b>	42138797
<b>Application Number:</b>	16852790
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5321
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas Lee/Shelly Darrenkamp
<b>Filer Authorized By:</b>	Thomas Lee
<b>Attorney Docket Number:</b>	BEEL3004C/TL
<b>Receipt Date:</b>	10-MAR-2021
<b>Filing Date:</b>	20-APR-2020
<b>Time Stamp:</b>	15:30:10
<b>Application Type:</b>	Utility under 35 USC 111(a)

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	Filing Date	2020-04-20
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	Christopher A. Bartels
	Attorney Docket Number	BEEL3004C/TL

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	Filing Date		2020-04-20
	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name	Christopher A. Bartels	
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1	European Search Search in corresponding European Application No. 20212054.9, dated April 7, 2021.
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Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Christopher A. Bartels
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Name/Print	THOMAS LEE	Registration Number	66396

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(11) **EP 1 462 998 A2**

(12) **EUROPEAN PATENT APPLICATION**

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- **Gallo, Kevin T.**  
**Woodinville, Washington 98072 (US)**
- **Wong, Gilman K.**  
**Redmond, Washington 98052 (US)**
- **Smith, Adam. M.**  
**Kirkland, Washington 98033 (US)**
- **Subramanian, Sriram**  
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(30) Priority: **27.03.2003 US 401717**

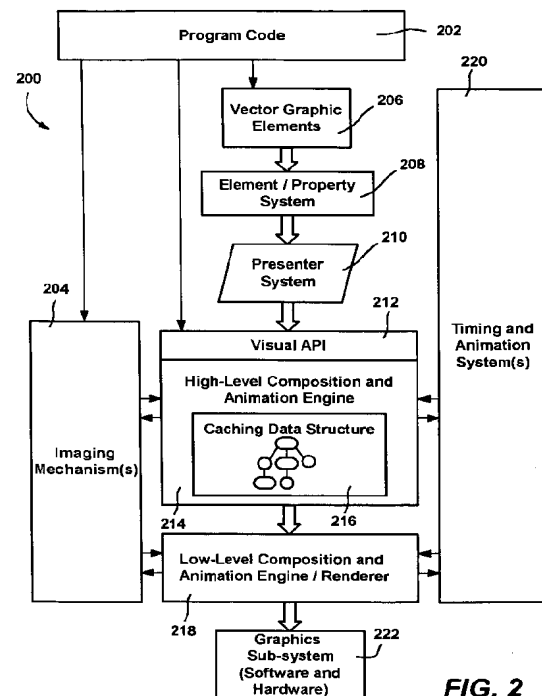
(71) Applicant: **MICROSOFT CORPORATION**  
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**Stockmair & Schwanhäusser Anwaltssozietät**  
**Maximilianstrasse 58**  
**80538 München (DE)**

(54) **Markup language and object model for vector graphics**

(57) An element object model and a vector graphics markup language for using that element object model in a manner that allows program code developers to consistently interface with a scene graph data structure to produce graphics. The vector graphics element object model generally corresponds to shape elements and other elements including image and video elements that correlate with a scene graph object model of the scene graph. Markup may be parsed into data including elements in an element tree that is translated into the objects of a scene graph data structure. Other markup may be translated directly into data and calls that create the scene graph objects. The markup language provides distinct ways to describe an element, including a simple string format or complex property syntax, which may be named, enabling reuse in other locations in the markup.



**FIG. 2**

**EP 1 462 998 A2**

**EP 1 462 998 A2****Description****CROSS-REFERENCE TO RELATED APPLICATIONS**

5 [0001] The present invention is related to the following copending United States Patent Applications: Serial No. 10/184,795 entitled Multiple-Level Graphics Processing System and Method; Serial No. 10/184,796, entitled Generic Parameterization for a Scene Graph; Serial No. 10/185,775 entitled "Intelligent Caching Data Structure for Immediate Mode Graphics;" each filed on June 27, 2002; and United States Patent Application entitled "Visual and Scene Graph Interfaces" (Attorney Docket No. 3470), filed concurrently herewith. Each related application is assigned to the assignee  
10 of the present patent application and hereby incorporated by reference in its entirety.

**FIELD OF THE INVENTION**

15 [0002] The invention relates generally to computer systems, and more particularly to the processing of graphical and other video information for display on computer systems.

**BACKGROUND OF THE INVENTION**

20 [0003] The limits of the traditional immediate mode model of accessing graphics on computer systems are being reached, in part because memory and bus speeds have not kept up with the advancements in main processors and/or graphics processors. In general, the current (e.g., WM\_PAINT) model for preparing a frame requires too much data processing to keep up with the hardware refresh rate when complex graphics effects are desired. As a result, when complex graphics effects are attempted with conventional graphics models, instead of completing the changes that result in the perceived visual effects in time for the next frame, the changes may be added over different frames, causing  
25 results that are visually and noticeably undesirable.

[0004] A new model for controlling graphics output is described in the aforementioned United States Patent Application Serial Nos. 10/184,795, 10/184,796, and 10/185,775. This new model provides a number of significant improvements in graphics processing technology. For example, U.S. Serial No. 10/184,795 is generally directed towards a multiple-level graphics processing system and method, in which a higher-level component (e.g., of an operating system) performs computationally intensive aspects of building a scene graph, updating animation parameters and traversing the scene graph's data structures, at a relatively low operating rate, in order to pass simplified data structures and/or graphics commands to a low-level component. Because the high-level processing greatly simplifies the data, the low-level component can operate at a faster rate, (relative to the high-level component), such as a rate that corresponds to the frame refresh rate of the graphics subsystem, to process the data into constant output data for the graphics subsystem. When animation is used, instead of having to redraw an entire scene with changes, the low-level processing may interpolate parameter intervals as necessary to obtain instantaneous values that when rendered provide a slightly changed scene for each frame, providing smooth animation.

[0005] U.S. Serial No. 10/184,796 describes a parameterized scene graph that provides mutable (animated) values and parameterized graph containers such that program code that wants to draw graphics (e.g., an application program or operating system component) can selectively change certain aspects of the scene graph description, while leaving other aspects intact. The program code can also reuse already-built portions of the scene graph, with possibly different parameters. As can be appreciated, the ability to easily change the appearance of displayed items via parameterization and/or the reuse of existing parts of a scene graph provide substantial gains in overall graphics processing efficiency.

40 [0006] U.S. Serial No. 10/185,775 generally describes a caching data structure and related mechanisms for storing visual information via objects and data in a scene graph. The data structure is generally associated with mechanisms that intelligently control how the visual information therein is populated and used. For example, unless specifically requested by the application program, most of the information stored in the data structure has no external reference to it, which enables this information to be optimized or otherwise processed. As can be appreciated, this provides efficiency and conservation of resources, e.g., the data in the cache data structure can be processed into a different format that is more compact and/or reduces the need for subsequent, repeated processing, such as a bitmap or other post-processing result.

45 [0007] While the above improvements provide substantial benefits in graphics processing technology, there still needs to be a way for programs to effectively use this improved graphics model and its other related improvements in a straightforward manner. What is needed is a comprehensive yet straightforward way for programs to take advantage of the many features and graphics processing capabilities provided by the improved graphics model and thereby output complex graphics in an efficient manner.  
55

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**SUMMARY OF THE INVENTION**

[0008] Briefly, the present invention provides an element object model and a vector graphics markup language for accessing that element object model in a manner that allows program code developers to consistently interface with a scene graph data structure to produce graphics. The vector graphics markup language comprises an interchange format for expressing vector graphics via the element object model. When interpreted, the markup is parsed into data including elements in an element tree that is translated into the objects of a scene graph data structure. At the element tree level, a property system and presenter system are provided to provide rich programmability features, including inheritance characteristics and eventing, making it straightforward for scene designers to design possibly complex scenes. In general, the vector graphics elements correspond to shape elements and other elements including image and video elements that correlate with scene graph objects of the scene graph object model. The properties and other resources of the vector graphics elements also correlate with similar properties and resources the scene graph object model.

[0009] The vector graphics system can thus program to an element level, in which each of the drawing shapes is represented as an element at the same level as the rest of the programmable elements in a page/screen, allowing interaction with the presenter system, events and properties. The vector graphics system also provides a mechanism for programming to a resource level, by which scene designers can essentially shortcut the element tree and presenter system and program directly to the visual API layer that interfaces with the scene graph data structure. This provides a more efficient and lightweight way to output the appropriate object, although losing of some of the programmability of the element level. In one implementation, when a fill of type "visual brush" is programmed, the parser can directly call the API layer with resource level data to create a corresponding visual paint object (which is also a correlation between the element object model and the scene graph object model). In this two-tiered system, element level vector graphics get parsed into created elements, which need later translation to the objects, while resource level vector graphics get parsed and directly stored in an efficient manner. At the same time, the resource level data or the objects created thereby can be referenced by elements and part of the element tree. To this end, elements including visual paint elements may be named. The scene designer thus has the ability to balance efficiency against programmability as needed.

[0010] The element class hierarchy includes a shape class, an image class, a video class and a canvas class. Elements of the shape class include rectangle, polyline, polygon, path, line and ellipse. Each element may include or be associated with fill (property) data, stroke data, clipping data, transform data, filter effect data and mask data. Shapes correspond to geometry (of the scene graph object model) that is drawn with inherited and cascaded presentation properties that are used to construct the pen and the brush needed to draw the shapes. The image class is more specific than a shape and can include more raster graphical data, while the video class allows video (or similar multimedia) to be played within a displayed element. The canvas class may act as a container for shapes, to keep shapes lightweight.

[0011] In one implementation the markup code is interpreted by a parser / translator which generally adds element-level elements to an element tree / property system and attaches presenters to those elements. The presenter system then takes the element tree with the attached presenters and translates the data to objects (via a builder) and calls to a visual API layer that interfaces with the scene graph and creates the scene graph objects.

[0012] The markup language provides distinct ways to describe an element, including a simple string format or a complex object notation (a complex property syntax). For a simple string format, the parser / translator and/or presenter system uses a type converter for converting a string to an appropriate visual API object. When the fill attribute is too complex to fit into a single string, complex property syntax, which may be inline in the markup, is used to describe the property set. Because the same rendering model is shared between the element level and the API level, many of the objects are the same, which makes parsing / translation highly efficient and provides other benefits. A resource instance also may be located elsewhere (e.g., in the markup or a file), and referenced by a name. In this manner, a scene designer can reuse an element in the element tree throughout a scene, including elements described by the complex property syntax.

[0013] Other benefits and advantages will become apparent from the following detailed description when taken in conjunction with the drawings, in which:

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0014]

FIGURE 1 is a block diagram representing an exemplary computer system into which the present invention may be incorporated;

FIG. 2 is a block diagram generally representing a graphics layer architecture into which the present invention may



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be incorporated;

FIG. 3 is a representation of a scene graph of visuals and associated components for processing the scene graph such as by traversing the scene graph to provide graphics commands and other data in accordance with an aspect of the present invention;

FIG. 4 is a representation of a scene graph of validation visuals, drawing visuals and associated drawing primitives constructed in accordance with an aspect of the present invention;

FIG. 5 is a representation of a visual class, of an object model, in accordance with an aspect of the present invention;

FIG. 6 is a representation of various other objects of the object model, in accordance with an aspect of the present invention;

FIG. 7 is a diagram representing transformation of a visual's data in accordance with an aspect of the present invention;

FIGS. 8A and 8B are representations of transformations of a visual's data in a geometry scale and a non-uniform scale, respectively, in accordance with an aspect of the present invention;

FIGS. 9A-9C are block diagrams of surface visual objects and other visuals and components in accordance with an aspect of the present invention;

FIGS. 10A and 10B are diagrams representing HWnd visual objects in accordance with an aspect of the present invention;

FIG. 11 is a diagram representing a layered visual object in accordance with an aspect of the present invention;

FIG. 12 is a representation of geometry classes of the object model, in accordance with an aspect of the present invention;

FIG. 13 is a representation of a PathGeometry structure, in accordance with an aspect of the present invention;

FIG. 14 is a representation of a scene graph of visuals and drawing primitives showing example graphics produced by the primitives, in accordance with an aspect of the present invention;

FIG. 15 is a representation of brush classes of the object model, in accordance with an aspect of the present invention;

FIG. 16 is a representation of rendered graphics resulting from data in a linear gradient brush object, in accordance with an aspect of the present invention;

FIG. 17 is a representation of rendered graphics resulting from data in a radial gradient brush object, in accordance with an aspect of the present invention;

FIG. 18 is a representation of rendered graphics resulting from having various stretch values, in accordance with an aspect of the present invention;

FIG. 19 is a representation of rendered graphics resulting from having various tile values, in accordance with an aspect of the present invention;

FIG. 20 is a flow diagram generally representing logic for interpreting a visual, including a brush object, to generate graphics in accordance with an aspect of the present invention;

FIG. 21 is a representation of a grid and transformed grid, resulting from data in a visual brush object, in accordance with an aspect of the present invention;

FIG. 22 is a representation of the grid and transformed grid, with rendered graphics therein drawn from a visual, in accordance with an aspect of the present invention;

FIG. 23 is a representation of a rendered nine grid brush object in accordance with an aspect of the present invention;

FIG. 24 is a representation of transform classes of the object model, in accordance with an aspect of the present invention;

FIG. 25 is a representation of element classes of the element object model, in accordance with an aspect of the present invention;

FIG. 26 is a representation of components for interpreting markup language code to interface with the visual API layer, in accordance with an aspect of the present invention; and

FIG. 27 is a representation of clipping via a geometry path in accordance with an aspect of the present invention.

**DETAILED DESCRIPTION**

**EXEMPLARY OPERATING ENVIRONMENT**

[0015] FIGURE 1 illustrates an example of a suitable computing system environment 100 on which the invention may be implemented. The computing system environment 100 is only one example of a suitable computing environment and is not intended to suggest any limitation as to the scope of use or functionality of the invention. Neither should the computing environment 100 be interpreted as having any dependency or requirement relating to any one or combination of components illustrated in the exemplary operating environment 100.

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[0016] The invention is operational with numerous other general purpose or special purpose computing system environments or configurations. Examples of well known computing systems, environments, and/or configurations that may be suitable for use with the invention include, but are not limited to, personal computers, server computers, handheld or laptop devices, tablet devices, multiprocessor systems, microprocessor-based systems, set top boxes, programmable consumer electronics, network PCs, minicomputers, mainframe computers, distributed computing environments that include any of the above systems or devices, and the like.

[0017] The invention may be described in the general context of computer-executable instructions, such as program modules, being executed by a computer. Generally, program modules include routines, programs, objects, components, data structures, and so forth, which perform particular tasks or implement particular abstract data types. The invention may also be practiced in distributed computing environments where tasks are performed by remote processing devices that are linked through a communications network. In a distributed computing environment, program modules may be located in both local and remote computer storage media including memory storage devices.

[0018] With reference to FIG. 1, an exemplary system for implementing the invention includes a general purpose computing device in the form of a computer 110. Components of the computer 110 may include, but are not limited to, a processing unit 120, a system memory 130, and a system bus 121 that couples various system components including the system memory to the processing unit 120. The system bus 121 may be any of several types of bus structures including a memory bus or memory controller, a peripheral bus, and a local bus using any of a variety of bus architectures. By way of example, and not limitation, such architectures include Industry Standard Architecture (ISA) bus, Micro Channel Architecture (MCA) bus, Enhanced ISA (EISA) bus, Video Electronics Standards Association (VESA) local bus, Accelerated Graphics Port (AGP) bus, and Peripheral Component Interconnect (PCI) bus also known as Mezzanine bus.

[0019] The computer 110 typically includes a variety of computer-readable media. Computer-readable media can be any available media that can be accessed by the computer 110 and includes both volatile and nonvolatile media, and removable and non-removable media. By way of example, and not limitation, computer-readable media may comprise computer storage media and communication media. Computer storage media includes both volatile and nonvolatile, removable and non-removable media implemented in any method or technology for storage of information such as computer-readable instructions, data structures, program modules or other data. Computer storage media includes, but is not limited to, RAM, ROM, EEPROM, flash memory or other memory technology, CD-ROM, digital versatile disks (DVD) or other optical disk storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to store the desired information and which can be accessed by the computer 110. Communication media typically embodies computer-readable instructions, data structures, program modules or other data in a modulated data signal such as a carrier wave or other transport mechanism and includes any information delivery media. The term "modulated data signal" means a signal that has one or more of its characteristics set or changed in such a manner as to encode information in the signal. By way of example, and not limitation, communication media includes wired media such as a wired network or direct-wired connection, and wireless media such as acoustic, RF, infrared and other wireless media. Combinations of the any of the above should also be included within the scope of computer-readable media.

[0020] The system memory 130 includes computer storage media in the form of volatile and/or nonvolatile memory such as read only memory (ROM) 131 and random access memory (RAM) 132. A basic input/output system 133 (BIOS), containing the basic routines that help to transfer information between elements within computer 110, such as during start-up, is typically stored in ROM 131. RAM 132 typically contains data and/or program modules that are immediately accessible to and/or presently being operated on by processing unit 120. By way of example, and not limitation, FIG. 1 illustrates operating system 134, application programs 135, other program modules 136 and program data 137.

[0021] The computer 110 may also include other removable/non-removable, volatile/nonvolatile computer storage media. By way of example only, FIG. 1 illustrates a hard disk drive 141 that reads from or writes to non-removable, nonvolatile magnetic media, a magnetic disk drive 151 that reads from or writes to a removable, nonvolatile magnetic disk 152, and an optical disk drive 155 that reads from or writes to a removable, nonvolatile optical disk 156 such as a CD ROM or other optical media. Other removable/non-removable, volatile/nonvolatile computer storage media that can be used in the exemplary operating environment include, but are not limited to, magnetic tape cassettes, flash memory cards, digital versatile disks, digital video tape, solid state RAM, solid state ROM, and the like. The hard disk drive 141 is typically connected to the system bus 121 through a non-removable memory interface such as interface 140, and magnetic disk drive 151 and optical disk drive 155 are typically connected to the system bus 121 by a removable memory interface, such as interface 150.

[0022] The drives and their associated computer storage media, discussed above and illustrated in FIG. 1, provide storage of computer-readable instructions, data structures, program modules and other data for the computer 110. In FIG. 1, for example, hard disk drive 141 is illustrated as storing operating system 144, application programs 145, other program modules 146 and program data 147. Note that these components can either be the same as or different from

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operating system 134, application programs 135, other program modules 136, and program data 137. Operating system 144, application programs 145, other program modules 146, and program data 147 are given different numbers herein to illustrate that, at a minimum, they are different copies. A user may enter commands and information into the computer 110 through input devices such as a tablet (electronic digitizer) 164, a microphone 163, a keyboard 162 and pointing device 161, commonly referred to as mouse, trackball or touch pad. Other input devices (not shown) may include a joystick, game pad, satellite dish, scanner, or the like. These and other input devices are often connected to the processing unit 120 through a user input interface 160 that is coupled to the system bus, but may be connected by other interface and bus structures, such as a parallel port, game port or a universal serial bus (USB). A monitor 191 or other type of display device is also connected to the system bus 121 via an interface, such as a video interface 190. The monitor 191 may also be integrated with a touch-screen panel 193 or the like that can input digitized input such as handwriting into the computer system 110 via an interface, such as a touch-screen interface 192. Note that the monitor and/or touch screen panel can be physically coupled to a housing in which the computing device 110 is incorporated, such as in a tablet-type personal computer, wherein the touch screen panel 193 essentially serves as the tablet 164. In addition, computers such as the computing device 110 may also include other peripheral output devices such as speakers 195 and printer 196, which may be connected through an output peripheral interface 194 or the like.

**[0023]** The computer 110 may operate in a networked environment using logical connections to one or more remote computers, such as a remote computer 180. The remote computer 180 may be a personal computer, a server, a router, a network PC, a peer device or other common network node, and typically includes many or all of the elements described above relative to the computer 110, although only a memory storage device 181 has been illustrated in FIG. 1. The logical connections depicted in FIG. 1 include a local area network (LAN) 171 and a wide area network (WAN) 173, but may also include other networks. Such networking environments are commonplace in offices, enterprise-wide computer networks, intranets and the Internet.

**[0024]** When used in a LAN networking environment, the computer 110 is connected to the LAN 171 through a network interface or adapter 170. When used in a WAN networking environment, the computer 110 typically includes a modem 172 or other means for establishing communications over the WAN 173, such as the Internet. The modem 172, which may be internal or external, may be connected to the system bus 121 via the user input interface 160 or other appropriate mechanism. In a networked environment, program modules depicted relative to the computer 110, or portions thereof, may be stored in the remote memory storage device. By way of example, and not limitation, FIG. 1 illustrates remote application programs 185 as residing on memory device 181. It will be appreciated that the network connections shown are exemplary and other means of establishing a communications link between the computers may be used.

### GRAPHICS ARCHITECTURE

**[0025]** One aspect of the present invention is generally directed to allowing program code, such as an application or operating system component, to communicate drawing instructions and other information (e.g., image bitmaps) to graphics components in order to render graphical output on the system display. To this end, the present invention provides a markup language along with a set of shape elements and other elements, a grouping and compositing system, and integration with a general property system in an object model to enable programs to populate a scene graph with data structures, drawing primitives (commands), and other graphics-related data. When processed, the scene graph results in graphics being displayed on the screen.

**[0026]** FIG. 2 represents a general, layered architecture 200 into which the present invention may be implemented. As represented in FIG. 2, program code 202 (e.g., an application program or operating system component or the like) may be developed to output graphics data in one or more various ways, including via imaging 204, via vector graphic elements 206, and/or via function / method calls placed directly to a visual application programming interface (API) layer 212. Direct interaction with the API layer is further described in the aforementioned copending patent application entitled "Visual and Scene Graph Interfaces."

**[0027]** In general, imaging 204 provides the program code 202 with a mechanism for loading, editing and saving images, e.g., bitmaps. These images may be used by other parts of the system, and there is also a way to use the primitive drawing code to draw to an image directly.

**[0028]** In accordance with an aspect of the present invention, vector graphics elements 206 provide another way to draw graphics, consistent with the rest of the object model (as described below). Vector graphic elements 206 may be created via a markup language, which an element / property system 208 and presenter system 210 processes to make appropriate calls to the visual API layer 212. As described below with reference to FIG. 26, in general the vector graphic elements 206 are parsed into objects of the object model from which a scene graph is drawn, which may be provided to the scene graph via an element level via the element / property system 208 and presenter system 210, or may be provided in a more efficient manner at a resource level, as also described below.

**[0029]** In one implementation, the graphics layer architecture 200 includes a high-level composition and animation

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engine 214, which includes or is otherwise associated with a caching data structure 216. The caching data structure 216 contains a scene graph comprising hierarchically-arranged objects that are managed according to a defined object model, as described below. In general, the visual API layer 212 provides the program code 202 (and the presenter system 210) with an interface to the caching data structure 216, including the ability to create objects, open and close objects to provide data to them, and so forth. In other words, the high-level composition and animation engine 214 exposes a unified media API layer 212 by which developers may express intentions about graphics and media to display graphics information, and provide an underlying platform with enough information such that the platform can optimize the use of the hardware for the program code. For example, the underlying platform will be responsible for caching, resource negotiation and media integration.

[0030] In one implementation, the high-level composition and animation engine 214 passes an instruction stream and possibly other data (e.g., pointers to bitmaps) to a fast, low-level compositing and animation engine 218. As used herein, the terms "high-level" and "low-level" are similar to those used in other computing scenarios, wherein in general, the lower a software component is relative to higher components, the closer that component is to the hardware. Thus, for example, graphics information sent from the high-level composition and animation engine 214 may be received at the low-level compositing and animation engine 218, where the information is used to send graphics data to the graphics subsystem including the hardware 222.

[0031] The high-level composition and animation engine 214 in conjunction with the program code 202 builds a scene graph to represent a graphics scene provided by the program code 202. For example, each item to be drawn may be loaded with drawing instructions, which the system can cache in the scene graph data structure 216. As will be described below, there are a number of various ways to specify this data structure 216, and what is drawn. Further, the high-level composition and animation engine 214 integrates with timing and animation systems 220 to provide declarative (or other) animation control (e.g., animation intervals) and timing control. Note that the animation system allows animate values to be passed essentially anywhere in the system, including, for example, at the element property level 208, inside of the visual API layer 212, and in any of the other resources. The timing system is exposed at the element and visual levels.

[0032] The low-level compositing and animation engine 218 manages the composing, animating and rendering of the scene, which is then provided to the graphics subsystem 222. The low-level engine 218 composes the renderings for the scenes of multiple applications, and with rendering components, implements the actual rendering of graphics to the screen. Note, however, that at times it may be necessary and/or advantageous for some of the rendering to happen at higher levels. For example, while the lower layers service requests from multiple applications, the higher layers are instantiated on a per-application basis, whereby is possible via the imaging mechanisms 204 to perform time-consuming or application-specific rendering at higher levels, and pass references to a bitmap to the lower layers.

**SCENE GRAPH OBJECT MODEL**

[0033] As described below, the rendering model is shared by the higher-level, control-based vector graphics elements 206, and the lower-level objects created by the visual API layer 212 used in the scene graph data structure 216. This provides a significant amount of correlation between the higher-level elements of the present invention, and the lower-level objects. The following describes one implementation of the scene graph object model.

[0034] FIGS. 3 and 4 show example scene graphs 300 and 400, respectively, including a base object referred to as a visual. In general, a visual comprises an object that represents a virtual surface to the user and has a visual representation on the display. As represented in FIG. 5, a base class visual provides the base functionality for other visual types, that is, the visual class 500 is an abstract base class from which visual types (e.g., 501-506) derive.

[0035] As represented in FIG. 3, a top-level (or root) visual 302 is connected to a visual manager object 304, which also has a relationship (e.g., via a handle) with a window (HWND) 306 or similar unit in which graphic data is output for the program code. The VisualManager 304 manages the drawing of the top-level visual (and any children of that visual) to that window 306. FIG. 6 shows the VisualManager as one of a set of other objects 620 in the object model of the graphics system described herein.

[0036] To draw, the visual manager 304 processes (e.g., traverses or transmits) the scene graph as scheduled by a dispatcher 308, and provides graphics instructions and other data to the low level component 218 (FIG. 2) for its corresponding window 306, such as generally described in U.S. Patent Application Serial Nos. 10/184,795, 10/184,796, and 10/185,775. The scene graph processing will ordinarily be scheduled by the dispatcher 308 at a rate that is relatively slower than the refresh rate of the lower-level component 218 and/or graphics subsystem 222. FIG. 3 shows a number of child visuals 310-315 arranged hierarchically below the top-level (root) visual 302, some of which are represented as having been populated via drawing contexts 316, 317 (shown as dashed boxes to represent their temporary nature) with associated instruction lists 318 and 319, respectively, e.g., containing drawing primitives and other visuals. The visuals may also contain other property information, as shown in the following example visual class:



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```

public abstract class Visual : VisualComponent
{
    public Transform Transform { get; set; }
    public float Opacity { get; set; }
    public BlendMode BlendMode { get; set; }
    public Geometry Clip { get; set; }
    public bool Show { get; set; }
    public HitTestResult HitTest(Point point);
    public bool IsDescendant(Visual visual);
    public static Point TransformToDescendant(
        Visual reference,
        Visual descendant,
        Point point);
    public static Point TransformFromDescendant(
        Visual reference,
        Visual descendant,
        Point point);
    public Rect CalculateBounds(); // Loose bounds
    public Rect CalculateTightBounds(); //
    public bool HitTestable { get; set; }
    public bool HitTestIgnoreChildren { get; set; }
    public bool HitTestFinal { get; set; }
}

```

**[0037]** A transformation, set by the transform property, defines the coordinate system for the sub-graph of a visual. The coordinate system before the transformation is called pre-transform coordinate system, the one after the transform is called post-transform coordinate system, that is, a visual with a transformation is equivalent to a visual with a transformation node as a parent. FIG. 7 generally provides an example of transformation, identifying the pre-transformation and post-transformation coordinate systems relative to a visual. To get or set the transformation of a visual, the Transform property may be used.

**[0038]** Note that the coordinate transforms may be applied in a uniform way to everything, as if it were in a bitmap. Note that this does not mean that transformations always apply to bitmaps, but that what gets rendered is affected by transforms equally. By way of example, if the user draws a circle with a round pen that is one inch wide and then applies a scale in the X direction of two to that circle, the pen will be two inches wide at the left and right and only one inch wide at the top and bottom. This is sometimes referred to as a compositing or bitmap transform (as opposed to a skeleton or geometry scale that affects the geometry only). FIG. 8A is a representation of scaling transformation, with a non-transformed image 800 appearing on the left and a transformed image 802 with a non-uniform scale appearing on the right. FIG. 8B is a representation of scaling transformation, with the non-transformed image 800 appearing on the left and a transformed image 804 with geometry scaling appearing on the right.

**[0039]** With respect to coordinate transformation of a visual, TransformToDescendant transforms a point from the reference visual to a descendant visual. The point is transformed from the post-transformation coordinate space of the reference visual to the post-transformation coordinate space of the descendant visual. TransformFromDescendant transforms a point from the descendant visual up the parent chain to the reference visual. The point is transformed from post-transformation coordinate space of the descendant visual to post-transformation coordinate space of the reference visual. The CalculateBounds method returns the bounding box of the content of the Visual in Post-Transformation coordinate space. Note that there may be an alternative version of the API where more specific specifications are allowed as to how the transform on a visual is interpreted during a coordinate transformation. For example, the transform on the reference and descendant visual may or may not be taken into account. In this alternative, there are thus four options, e.g., coordinates can be transformed from pre-transformation to pre-transformation space, pre-transformation to post-transformation space, post-transformation to pre-transformation space, and post-transformation to post-transformation space. The same concept applies to hit-testing, e.g., hit-testing may be started in pre-transformation or post-transformation transform coordinate space, and the hit-test results might be in pre-transformation or post-transformation coordinate space.

**[0040]** The clip property sets (and gets) the clipping region of a visual. Any Geometry (the geometry class is described below with reference to FIG. 12) can be used as a clipping region, and the clipping region is applied in Post-Transform

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mation coordinate space. In one implementation, a default setting for the clipping region is null, i.e., no clipping, which can be thought of as an infinite big clipping rectangle from  $(-\infty, -\infty)$  to  $(+\infty, +\infty)$ .

[0041] The Opacity property gets/sets the opacity value of the visual, such that the content of the visual is blended on the drawing surface based on the opacity value and the selected blending mode. The BlendMode property can be used to set (or get) the blending mode that is used. For example, an opacity (alpha) value may be set between 0.0 and 1.0, with linear alpha blending set as the mode, e.g.,  $\text{Color} = \text{alpha} * \text{foreground color} + (1.0 - \text{alpha}) * \text{background color}$ . Other services, such as special effects properties, may be included in a visual, e.g., blur, monochrome, and so on.

[0042] The various services (including transform, opacity, clip) can be pushed and popped on a drawing context, and push/pop operations can be nested, as long as a pop call matches a push call. For example `PushTransform(...); PushOpacity(...); PopTransform(...)` is illegal, because before the `PopTransform` call, `PopOpacity` needs to be called.

[0043] The `PushTransform` method pushes a transformation. Subsequent drawing operations are executed with respect to the pushed transformation. The `PopTransform` pops the transformation pushed by the matching `PushTransform` call:

```
void PushTransform(Transform transform);  
void PushTransform(Matrix matrix);  
void PopTransform();
```

[0044] Similarly, the `PushOpacity` method pushes an opacity value. Subsequent drawing operations are rendered on a temporary surface with the specified opacity value and then composite into the scene. `PopOpacity` pops the opacity pushed by the matching `PushOpacity` call:

```
void PushOpacity(float opacity);  
void PushOpacity(NumberAnimationBase opacity);  
void PopOpacity();
```

[0045] The `PushClip` method pushes a clipping geometry. Subsequent drawing operations are clipped to the geometry. The clipping is applied in post transformation space. `PopClip` pops the clipping region pushed by the matching `PushClip` call:

```
void PushClip(Geometry clip);  
void PopClip();
```

[0046] Note that push operations can be arbitrarily nested as long as the pop operations are matched with a push. For example, the following is valid:

```
PushTransform(...);  
DrawLine(...);  
PushClip(...);  
DrawLine(...);  
PopClip();  
PushTransform(...);  
DrawRect(...);  
PopTransform();  
PopTransform();
```

[0047] Hit-testing is performed in the Post-Transformation coordinate space, and returns an identity of each hit-testable visual that is hit, e.g., when a pen or mouse click is detected. An alternate version of the interface may allow for hit-testing to start at a Pre-Transformation coordinate space relative to the visual where the hit test is started. Visuals that are hit are returned in right-to-left, depth-first order. Hit-testing may be controlled with various flags, including `HitTestable`, which determines if the visual is hit-testable (the default is true), and `HitTestFinal`, which determines if hit-testing stops when the visual is hit, i.e. if a Visual is hit and the `HitTestFinal` property of the visual is true, hit-testing aborts and returns the results collected up to this point (the default is false). Another flag is `HitTestIgnoreChildren`, which determines if the children of a visual should be considered when hit-testing is performed on a visual (the default is false).

[0048] A `ProxyVisual` is a visual that may be added more than once into the scene graph. Since any visual referred

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to by a ProxyVisual may be reached by multiple paths from the root, read services (TransformToDescendent, TransformFromDescendent and HitTest) do not work through a ProxyVisual. In essence, there is one canonical path from any visual to the root of the visual tree and that path does not include any ProxyVisuals.

**[0049]** As represented in FIG. 5, various types of visuals are defined in the object model, including ContainerVisuals 501, DrawingVisuals 502, ValidationVisuals 503, SurfaceVisuals 504 and HwndVisuals 505. The table below sets forth example methods of a DrawingVisual:

```
public class DrawingVisual : Visual
{
    public DrawingVisual();
    public IDrawingContext Open();
    public IDrawingContext Append();
}
```

**[0050]** A DrawingVisual is a container for graphical content (e.g. lines, text, images, and so forth). Note that it is possible to add a Visual into a DrawingVisual, but in some implementations this is not allowed. The DrawingVisual 502 includes an Open method, which returns an IDrawingContext that can be used to populate the DrawingVisual, e.g., with other visuals and drawing primitives, as described below. In one implementation, for various reasons also described below, a DrawingVisual may be only opened once to populate its drawing context; in other words, such a DrawingVisual is immutable. After the DrawingVisual has been populated, the DrawingVisual is closed using a Close method, e.g., on the drawing context. Note that an Open call may clear any contents (children) of a visual, however in one alternative implementation, there is provided an Append method, to open a current visual in a manner that appends to that visual. In other words, an OpenForAppend call works like Open, except the current content of the DrawingVisual is not cleared out on the open.

**[0051]** The following is an example of how a drawing context is used to populate a visual:

```
ContainerVisual cv1 = new ContainerVisual();
DrawingVisual dv1 = new DrawingVisual();
```

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```
5 // Open a drawing context. The context
// will automatically be closed when
// exiting the using block. This will also
// replace any contents that might already
// be in dv1.
using (IDrawingContext dc = dv1.Open())
{
10     dc.DrawLine(new Pen(Brushes.Blue), new Point(...), new Point(...));
}

// Add dv1 to the child collection of cv1
cv1.Children.Add(dv1);

15 // Add another arbitrary visual to cv1
cv1.Children.Add(someOtherVisual);

// Create another DrawingVisual
DrawingVisual dv2 = new DrawingVisual();

20 using (IDrawingContext dc = dv2.Open())
{
    // This sets up a new coordinate system
    // where everything is twice as big
    dv.PushTransform(new Scale(2.0, 2.0));

25     // This line is drawn in the new scaled
    // coordinate system.
    dc.DrawLine(new Pen(Brushes.Red), new Point(...), new Point(...));

    // This reverts to the original coordinate system.
30     dv.PopTransform();

    dc.DrawLine(new Pen(Brushes.Green), new Point(...), new Point(...));
}

35 // Add dv2 to the child collection of cv1;
cv1.Children.Add(dv2);
```

[0052] In general, a ValidationVisual 503 is conceptually similar to a DrawingVisual, except that a ValidationVisual is populated when the system requests that it be filled, instead of when the program code wants to populate it. For example, as described in U.S. Serial No. 10/185,775, the high-level composition and animation engine 214 (FIG. 2) may invalidate scene graph data as resources are needed, such as when part of a scene graph is not visible. For example if some parts are scrolled off the display, clipped, and so on. If the invalidated scene graph data is later needed, the program code 202 called will be called back to redraw (validate) the invalidated portion of the scene graph. To this end, one typical usage scenario is for a program code to subclass the ValidationVisual and override the OnValidate method. When the system calls the OnValidate method, a drawing context is passed in, and the program the uses the drawing context repopulate the ValidationVisual.

[0053] The example below shows one way to implement a simple ValidationVisual, e.g., one that draws a line with a certain color. The color of the line can be changed by calling SetColor. To force the update of the ValidationVisual, SetColor calls Invalidate to force the graphics sub-system to revalidate the ValidationVisual:



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```

public class MyValidationVisual : ValidationVisual
{
    public override void OnValidate(IDrawingContext dc)
    {
        dc.DrawLine(m_color, ...);
    }

    public void SetColor(Color newColor)
    {
        m_color = color;
        Invalidate(); // Force a redraw of the ValidationVisual to
                      // reflect the color change.
    }
    private Color m_color
}

```

[0054] This example shows how to use the ValidationVisual:

```

MyValidationVisual myVV = new MyValidationVisual();

container.Children.Add(myVV);

myVV.SetColor(new Color(...));

```

[0055] FIG. 4 shows an example scene graph 400 in which ContainerVisuals and DrawingVisuals are related in a scene graph, and have associated data in the form of drawing primitives, (e.g., in corresponding drawing contexts). The ContainerVisual is a container for Visuals, and ContainerVisuals can be nested into each other. The children of a ContainerVisual can be manipulated with a VisualCollection returned from a Children property of the VisualContainer. The order of the Visuals in the VisualCollection determines in which order the Visuals are rendered, i.e. Visuals are rendered from the lowest index to the highest index from back to front (painting order). For example, with proper parameters with three drawing visuals representing red, green, and blue rectangles hierarchically under a container visual, the following code would result in three rectangles being drawn (translating to the right and down), a red rectangle in back, a green rectangle in the middle and a blue rectangle in front:

```

VisualCollection vc = m_cv.Children;
vc.Add(new DrawingVisual());
vc.Add(new DrawingVisual());
vc.Add(new DrawingVisual());

for (int i = 0; i < vc.Count; i++)

```

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```

{
    DrawingVisual v = (DrawingVisual)(vc[i]);
    if (v != null)
    {
        v.Transform = Transform.CreateTranslation(i * 20.0f, i*20f);
        IDrawingContext dc = v.Open();
        dc.DrawRectangle(
            new Brush(colors[i]),
            null,
            new Point2D(0, 0),
            new Point2D(100.0f, 100.0f));
        v.Close(dc);
    }
}

```

**[0056]** As represented in FIG. 5, another type of visual object is a SurfaceVisual 504. In general, as represented in FIG. 3, a SurfaceVisual object 315 references an in-memory surface (bitmap) 322 that the program code 202 (FIG. 2) can access. The client program code 202 can supply its own surface memory, or it can request that the memory be allocated by the surface object.

**[0057]** The program code 202 has the option to open a SurfaceVisual and get a drawing context 323, into which the program code 202 can write pixel data 324 or the like and directly put those pixels onto the surface. This is represented in FIG. 3 by the dashed line between the surface object 322, the drawing context 323 (shown as a dashed box to represent its temporary nature) and the pixel data 324.

**[0058]** The program code 202 also has an option to create a surface visual manager 330 and associate a visual subgraph 332 with the SurfaceVisual 315. This option is represented in FIG. 3 by the dashed line between the surface object 322 and the surface visual manager 330. Note that the visual subgraph 332 can also nest other surface visuals, as also shown in FIG. 3. The surface visual manager 330 (also shown as a type of other object in the set 620 of FIG. 6) walks the visual subgraph 332 to update the SurfaceVisual bitmap 322. Further, note that this traversal is scheduled by the dispatcher 308, and for efficiency may be throttled to control how often this bitmap 322 is updated. The surface visual manager 330 does not have to traverse the visual subgraph 322 each time and/or at the same rate that the top level visual manager 302 walks the rest of the scene graph.

**[0059]** With respect to surfaces, as further described with reference to FIGS. 9A-9C, in general, the present graphics model thus allows compositing a set of visuals to a surface, immediate-mode rendering of vector and bitmap primitives into a surface, compositing a surface onto the desktop or onto another surface, and controlling which surface in a surface list is used to composite into or to draw into. A surface list is defined as a collection of one or more surfaces (i.e. frames/buffers) of physical (system or video) memory used to store compositions of visuals or graphical drawings, or both. One of the surfaces of the surface list may be set as a current back buffer where drawing and/or compositing is done, and one of the surfaces of the surface list is set as a current primary, or front buffer, which is used to composite onto another render target.

**[0060]** Surfaces may be used in a number of ways. By way of example, FIG. 9A shows compositing to a surface. In FIG. 9A, a surface visual manager object 900 connects a surface list 902 as a render target for a visual tree 904. During each compositing cycle, the visuals are composited into the surface of the surface list that is currently serving as the active back buffer for the surface list. The surface being composited to can include a surface owned by the client/high level compositing engine 214 (FIG. 2) for in-process compositing scenarios, a surface owned by the low-level compositing engine 218 for scenarios where the client does not need the bits but the low-level compositing engine 218 needs them to composite the surface onto another render target, or a cross-process surface, for scenarios where the client needs access to the surface bits, but the low-level compositing engine 218 also needs the surface for other compositing work.

**[0061]** The compositing is controlled by a timing service that is attached to the Visual Manager. One example of a timing service, is a manual mode that might be used as in the example below:

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```
// create a manual timing service and attach a visual manager
TimingService timingService = new ManualTimingService(visualManager);

// composite the visual tree to the current back buffer of the surface
visualManager.Render();

foreach (Tick tick in timingService)
```

```
{
    // advance the back buffer to the next frame of the surface
    surfaceList.NextFrame();

    // advance the time of the visual tree
    timingService.Tick(tick);

    // composite the visual tree to the current back buffer of surface
    visualManager.Render();
}
```

**[0062]** Another way to use a surface is with immediate-mode rendering to a surface, via a context. Attaching a surface list to a visual (a surface visual) enables immediate-mode rendering to the surface of the surface list that is currently serving as the active back buffer for the surface list. This rendering is done by obtaining a drawing context from the surface visual and executing drawing commands on that context, as described above. Note that obtaining a drawing context locks the surface so that other compositing operations cannot be done to it. Each drawing command is executed immediately, and vectors and other surfaces can be drawn (blended) onto the surface. However, other visuals cannot be drawn onto the surface, but instead can be composited into the surface by associating it with a visual manager, as previously described (e.g., in FIG. 9A).

```
// attach a surface list to a visual
SurfaceVisual surfaceVisual = new SurfaceVisual(surfaceList);

// enable immediate-mode rendering to (and lock) back buffer
surface
BaseDrawingContext dc = surfaceVisual.Open();

// draw a line (immediately) to the current back buffer of the
surface
dc.DrawLine (pen, startPoint, endPoint);
```

```
// unlock the surface - we're done with immediate-mode rendering
surfaceVisual.Close(dc);
```

**[0063]** Another use for surfaces is when compositing a surface onto another render target. To this end, once a surface list is attached to a surface visual, the surface can then be attached as a node in a visual tree, and the surface of the surface list that is currently serving as the primary or front buffer can be composited to another surface or to the desktop. This is illustrated in FIG. 9B and in the example below:

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```
// attach a surface list to a visual
SurfaceVisual surfaceVisual = new SurfaceVisual(surfaceList);

5 // Add the surfaceVisual to a visual tree for compositing onto another
  // render target
  rootVisual.Add(surfaceVisual);
```

10 **[0064]** Live composition to/from a surface is represented in FIG. 9C, where the above-described capabilities are combined so that compositing to the back buffer surface of a surface list and compositing from the front buffer surface of a surface list (e.g. to the desktop) happen simultaneously. Note that to eliminate the undesirable video effect known as tearing, the surface list should have at least two surfaces, a front and a back buffer surface. A surface used as in FIG. 9C is likely owned by the low-level engine 218, or is a cross-process surface to make the composition in the low level engine 218 perform better.

15 **[0065]** Surfaces are constructed as independent objects, as set forth in the examples of constructors below:

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```
public class Surface
{
    // create and allocate a blank surface without initial data
    public Surface(int width,
        int height,
        int dpi,
        PixelFormat pixelFormat,
        SurfaceFlags flags)

    // create a surface using the supplied memory
    public Surface(int width,
        int height,
        int dpi,
        PixelFormat pixelFormat,
        IntPtr pixels, // managed memory for the surface
        Int stride)

    // create from a source (i.e. Clone)
    public Surface(Surface sourceSurface,
        SurfaceFlags flags)

    // Create from File or URL
    public Surface (String filename,
        SurfaceFlags flags)

    // Create from Stream
    public Surface (System.IO.Stream stream,
        SurfaceFlags flags)

    // Create from HBITMAP (which can't be selected into an HDC)
    public Surface (HBITMAP hbitmap, HPALETTE hPalette)

    // Create from HICON
    public Surface (HICON hicon)

    // read-only properties
    public Int Width {get; }

    public Int Height {get; }

    public Int Dpi {get;}

    public PixelFormat Format{get; }

    public int Stride{get; }

    public IntPtr Buffer {get;}
}
```

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```

public class SurfaceList
{
    // Create a list of blank surfaces (without initial data).
    public SurfaceList (int width,
        int height,
        int dpi,
        PixelFormat pixelFormat,
        int numSurfaces,
        SurfaceFlags flags)

    // Create a SurfaceList that uses the specified surfaces
    // All the surfaces must have identical properties (w, h,
    // dpi, etc).
    public SurfaceList (Surface []surfaces)

    // change the front buffer to the first-in-line back buffer
    public Flip()

    // advance the back buffer to the next surface
    public Next()

    public int FrontBufferIndex {get; set;}

    public int BackBufferIndex {get; set;}

    public Surface GetFrontBuffer()
    public Surface GetBackBuffer()
    public Surface GetSurface(int surfaceIndex)
}

```

**[0066]** Once constructed, a surface and/or a surface list can be attached to a surface visual object or to a visual manager object.

```

// Create a surface visual
public SurfaceDrawingVisual(Surface surface)
public SurfaceDrawingVisual(SurfaceList surfaceList)

// Create a visual manager with a surface render target
public VisualManager(Surface surface)
public VisualManager(SurfaceList surfaceList)

```

**[0067]** Further, a surface can get data from a decoder, and/or send its data to an encoder for writing to a specific file format. Surfaces can also receive/send data from/to effect interfaces. A surface can be constructed for any pixel format from the full set of supported surface format types. However, some adjustments may be made to the specified pixel format, e.g., if the specified pixel format is less than 32 bits per pixel, then the format will be promoted to 32 bits per pixel. Whenever bits are requested from a surface in the original format, the surface will be copied to a buffer of the requested pixel format using a format conversion filter.

**[0068]** Returning to FIG. 5, yet another visual is an HwndVisual 505, which positions a Win32 child Hwnd in the scene graph. More particularly, legacy programs will still operate via the WM\_PAINT method (or the like) that draws to a child Hwnd (or the like) based on prior graphics technology. To support such programs in the new graphics processing model, the HwndVisual allows the Hwnd to be contained in a scene graph and moved as the parent visual is repositioned, as represented in FIG. 10A. As a result of limitations with existing Hwnds, however, when rendered, a child Hwnd can only be on top of other windows, and cannot be rotated or scaled like other visuals described above. Some clipping is possible, as represented in FIG. 10B, where the dashed lines indicate the Hwnd's displayed rectangle being clipped during relative movement with respect to its parent visual.

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[0069] Other types of visuals 506 are also feasible, and the present object model is extensible to allow others to be developed. For example, as represented in FIG. 11, a layered visual 1100 enables an application developer to separately control the information in a visual via multiple data streams, providing a finer granularity of control relative to visuals having a single data stream. Note that similar granularity of control can be accomplished by having (e.g., three) separate child visuals under a single parent visual, however this requires that the program code work with multiple visuals, which is more complicated than working with a single layered visual having indexes to multiple layers.

[0070] By way of example, in FIG. 11, background data, content data and border data are contained in a single layered visual, but are separated from one another as indexed by a layer value, e.g., 0, 1 or 2, respectively. Layers can be inserted, including tacked onto either end, and/or deleted, with the layering order (e.g., left-to-right as shown) defining an implied Z-order for display. Note that for security, child content and other data in a layered visual cannot be enumerated.

[0071] Other types of visuals include container visuals, and redirected child HWND visuals, in which content is drawn to a bitmap, and incorporated into a surface visual. Three-dimensional visuals enable a connection between two-dimensional and three dimensional worlds, e.g., a camera-like view is possible via a two-dimensional visual having a view into a three-dimensional world.

[0072] Many of the resource objects are immutable once created, that is, once they are created they cannot be changed for various reasons, including simplifying threading issues, preventing corruption by others, and simplifying the interaction with elements and APIs. Note that this generally simplifies the system. It should be noted, however, that it is feasible to have a system where such objects are mutable, but for example would require managing a dependency graph. For example, while it is possible to have a system where such objects are mutable, if program code changed the clip set on a Visual, the visual would need to be re-rendered, thus requiring a notification / registration mechanism, e.g., if a new clip is assigned to a visual, the visual registers itself with the clip for notifications (e.g., a clip changed notification). Thus, in one implementation, for simplification purposes, resource objects are immutable.

[0073] These resource objects can be defined with a constructor, which is a straightforward, generic way to create an object, or by using a companion builder object, as described below. For instance, to create a SolidColorBrush, (brush objects are described below), a constructor may be used:

```
Brush MyBrush = new SolidColorBrush(Colors.Red);
```

[0074] The user can also use the static members on the Brushes class to get a set of predefined colors.

[0075] Because immutable objects cannot be changed, to effectively change an object, the user needs to create a new object and replace the old one with it. To this end, many of the resource objects in the system may utilize the builder pattern, in which immutable objects are created with a builder class, which is a companion class that is mutable. The user creates an immutable object to mirror the parameters set on the builder, creates a new builder for that object, and initializes it from the immutable object. The user then changes the builder as necessary. Once done, the user can build a new object, by changing the builder and reusing it to create another immutable object. Note that having immutable objects with set properties is desirable, and that immutable objects cannot be changed, but only replaced by firing a property change event.

[0076] Thus, instead of using a constructor to create a SolidColorBrush as described above, a SolidColorBrushBuilder may be used:

```
SolidColorBrushBuilder MyBuilder = new  
SolidColorBrushBuilder();  
MyBuilder.Color = Colors.Red;  
Brush MyBrush = MyBuilder.ToBrush();
```

[0077] Most objects that take static values can also take animation objects. For instance, on the DrawingContext there is an override on DrawCircle that takes a PointAnimationBase for the center of the circle. In this way, the user can specify rich animation information at the primitive level. For resource objects there exists an animation collection in addition to the base value. These are composited, whereby if the user wanted to animate the above example, the user could specify the following example line before the brush is built:

```
MyBuilder.ColorAnimations.Add(new ColorAnimation (...));
```

[0078] Note that an object with animation parameters is still immutable, because its animation parameters are static. However, when the scene graph is processed (e.g., traversed), the meaning of animation parameters changes over time, giving the appearance of animated, not static, data.

[0079] As described above, visuals can be drawn on by populating their drawing contexts with various drawing prim-

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itives, including Geometry, ImageData and VideoData. Furthermore, there are a set of resources and classes that are shared through this entire stack. This includes Pens, Brushes, Geometry, Transforms and Effects. The IDrawingContext exposes a set of drawing operations that can be used to populate a DrawingVisual, ValidationVisual. ISurfaceDrawingContext, a base interface to IDrawing context, can be used to populate a SurfaceVisual. In other words, the drawing context exposes a set of drawing operations; for each drawing operation there are two methods, one that takes constants as arguments, and one that takes animators as arguments.

**[0080]** The DrawLine method draws a line with the specified pen from the start point to the end point.

```
public void DrawLine(Pen pen, Point start, Point end);
public void DrawLine(
    Pen pen,
    PointAnimationBase start,
    PointAnimationBase end);
```

**[0081]** The DrawRoundedRectangle method draws a rounded rectangle with the specified brush and pen; brush and pen can be null.

```
public void DrawRoundedRectangle(
    Brush brush,
    Pen pen,
    Point topLeft,
    Size size,
    float radius);
public void DrawRoundedRectangle(
    Brush brush,
    Pen pen,
    PointAnimationBase topLeft,
    SizeAnimationBase size,
    NumberAnimationBase radius);
public void DrawRoundedRectangle(
    Brush brush,
    Pen pen,
    Point topLeft,
    Point bottomRight,
    float rx,
    float ry);
public void DrawRoundedRectangle(
    Brush brush,
    Pen pen,
    PointAnimationBase topLeft,
    PointAnimationBase bottomRight,
    NumberAnimationBase radiusX,
    NumberAnimationBase radiusY);
```

**[0082]** The DrawGeometry method draws a path with the specified brush and pen; brush and pen can be null.

```
public void DrawGeometry(
    Brush brush,
```



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```
Pen pen,  
Geometry geometry);
```

[0083] The DrawRectangle method draws a rectangle with the specified brush and pen; brush and pen can be null.

```
public void DrawRectangle(  
    Brush brush,  
    Pen pen,  
    Point topLeft,  
    Size size);  
public void DrawRectangle(  
    Brush brush,  
    Pen pen,  
    PointAnimationBase topLeft,  
    SizeAnimationBase size);
```

[0084] The DrawSurface method draws a surface.

```
public void DrawSurface(  
    Surface surface,  
    Point topLeft,  
    Size size,  
    float opacity);  
public void DrawSurface(  
    Surface image,  
    PointAnimationBase topLeft,  
    SizeAnimationBase size,  
    NumberAnimationBase opacity);
```

[0085] Geometry is a type of class (FIG. 12) that defines a vector graphics skeleton, without stroke or fill. Each geometry object is a simple shape (LineGeometry, EllipseGeometry, RectangleGeometry), a complex single shape (PathGeometry) or a list of such shapes GeometryList with a combine operation (e.g., union, intersection, and so forth) specified. These objects form a class hierarchy as represented in FIG. 12.

[0086] As represented in FIG. 13, the PathGeometry is a collection of Figure objects. In turn, each of the Figure objects is composed of one or more Segment objects which actually define the figure's shape. A Figure is a sub-section of a Geometry that defines a segment collection. This segment collection is a single connected series of two-dimensional Segment objects. The Figure can be either a closed shape with a defined area, or just a connected series of Segments that define a curve, but no enclosed area.

[0087] The filled area of the PathGeometry is defined by taking the contained Figures that have their Filled property set to true, and applying a FillMode to determine the enclosed area. Note that the FillMode enumeration specifies how the intersecting areas of Figure objects contained in a Geometry are combined to form the resulting area of the Geometry. An "Alternate" rule determines whether a point is inside the canvas, by conceptually drawing a ray from that point to infinity in any direction, and then examining the places where a segment of the shape crosses the ray. By starting with a count of zero and adding one each time a Segment crosses the ray from left to right and subtracting one each time a path segment crosses the ray from right to left, after counting the crossings, if the result is zero then the point is outside the path. Otherwise, it is inside. A "winding" rule determines whether a point on the canvas is inside, and works by conceptually drawing a ray from that point to infinity in any direction and counting the number of path Segments from the given shape that the ray crosses. If this number is odd, the point is inside; if even, the point is outside.

[0088] As represented in FIG. 14, when geometry (e.g., a rectangle) is drawn, a brush or pen can be specified, as described below. Furthermore, the pen object also has a brush object. A brush object defines how to graphically fill a plane, and there is a class hierarchy of brush objects. This is represented in FIG. 14 by the filled rectangle 1402 that

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results when the visual including the rectangle and brush instructions and parameters is processed.

**[0089]** As described below, some types of Brushes (such as gradients and nine grids) size themselves. When used, the size for these brushes is obtained from the bounding box, e.g., when the GradientUnits/DestinationUnits for the Brush is set to ObjectBoundingBox, the bounding box of the primitive that is being drawn is used. If those properties are set to UserSpaceOnUse, then the coordinate space is used.

**[0090]** A Pen object holds onto a Brush along with properties for Width, LineJoin, LineCap, MiterLimit, DashArray and DashOffset, as represented in the example below:

```
public enum System.Windows.Media.PenLineCap
{
    Butt, Round, Square
}
```

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```
public enum System.Windows.Media.PenLineJoin
{
    Miter, Round, Bevel
}

public class System.Windows.Media.Pen
{
    // Constructors
    public Pen(Color color, float width);
    public Pen(Brush brush, float width);

    // Properties
    public float[] DashArray { get; }

    public float DashOffset { get; }
    public FloatAnimationCollection DashOffsetAnimations { get; }

    public PenLineCap LineCap { get; }
    public PenLineJoin LineJoin { get; }

    public float MiterLimit { get; }
    public FloatAnimationCollection MiterLimitAnimations { get; }

    public float Opacity { get; }
    public FloatAnimationCollection OpacityAnimations { get; }

    public Brush Brush { get; }

    public float Width { get; }
    public FloatAnimationCollection WidthAnimations { get; }
}

public sealed class System.Windows.Media.PenBuilder : Builder
{
    // Fields

    // Constructors
    public PenBuilder();
    public PenBuilder(Color color);
    public PenBuilder(Brush brush);
    public PenBuilder(Pen pen);

    // Properties
    public float[] DashArray { get; set; }

    public float DashOffset { get; set; }
    public FloatAnimationCollectionBuilder DashOffsetAnimations {
        get; }

    public PenLineCap LineCap { get; set; }
    public PenLineJoin LineJoin { get; set; }

    public float MiterLimit { get; set; }
```

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```

public FloatAnimationCollectionBuilder MiterLimitAnimations {
    get; }

public float Opacity { get; set; }
public FloatAnimationCollectionBuilder OpacityAnimations { get;
}

public Brush Brush { get; set; }

public float Width { get; set; }
public FloatAnimationCollectionBuilder WidthAnimations { get; }

// Methods
public Pen ToPen();
}

```

[0091] As mentioned above, the graphics object model of the present invention includes a Brush object model, which is generally directed towards the concept of covering a plane with pixels. Examples of types of brushes are represented in the hierarchy of FIG. 15, and, under a Brush base class, include SolidColorBrush, GradientBrush, ImageBrush, VisualBrush (which can reference a Visual) and NineGridBrush. GradientBrush includes LinearGradient and Radial-Gradient objects. As described above, Brush objects are immutable.

```

public abstract class System.Windows.Media.Brush
{
    float Opacity { get; }
    FloatAnimationCollection OpacityAnimations { get; }
}

```

[0092] The following sets forth an example BrushBuilder class:

```

public abstract class System.Windows.Media.BrushBuilder : Builder
{

```

```

    public virtual Brush ToBrush();
    public override sealed object CreateInstance();
    {
        return ToBrush();
    }
    float Opacity { get; set; }
    FloatAnimationCollectionBuilder OpacityAnimations { get; }
}

```

[0093] Note that Brush objects may recognize how they relate to the coordinate system when they are used, and/or how they relate to the bounding box of the shape on which they are used. In general, information such as size may be inferred from the object on which the brush is drawn. More particularly, many of the brush types use a coordinate system for specifying some of their parameters. This coordinate system can either be defined as relative to the simple bounding box of the shape to which the brush is applied, or it can be relative to the coordinate space that is active at the time that the brush is used. These are known, respectively, as ObjectBoundingBox mode and UserSpaceOnUse mode.

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```
public enum System.Windows.Media.BrushMappingMode
{
    ObjectBoundingBox,
    UserSpaceOnUse,
}
```

**[0094]** A SolidColorBrush object fills the identified plane with a solid color. If there is an alpha component of the color, it is combined in a multiplicative way with the corresponding opacity attribute in the Brush base class. The following sets forth an example SolidColorBrush object:

```
public sealed class System.Windows.Media.SolidColorBrush : Brush
{
    // Constructors
    public SolidColorBrush(); // initialize to black
    public SolidColorBrush(Color color);
    public SolidColorBrush(System.Windows.Media.Animation.ColorComposer
        colorComposer);

    // Properties
    public Color Color { get; }
    public IEnumerable ColorAnimations { get; }
}

public class System.Windows.Media.SolidColorBrushBuilder : BrushBuilder
{
    // Constructors
    public SolidColorBrushBuilder();
    public SolidColorBrushBuilder(Color color);
    public SolidColorBrushBuilder(SolidColorBrush scp);

    // Properties
    public Color Color { get; set; }
    public AnimationList ColorAnimations { get; }

    // Methods
    public virtual Brush ToBrush();
}
```

**[0095]** The GradientBrush objects, or simply gradients, provide a gradient fill, and are drawn by specifying a set of gradient stops, which specify the colors along some sort of progression. The gradient is drawn by performing linear interpolations between the gradient stops in a gamma 2.2 RGB color space; interpolation through other gammas or other color spaces (HSB, CMYK and so forth, is also a feasible alternative. Two types of gradient objects include linear and radial gradients.

**[0096]** In general, gradients are composed of a list of gradient stops. Each of these gradient stops contains a color (with the included alpha value) and an offset. If there are no gradient stops specified, the brush is drawn as a solid transparent black, as if there were no brush specified at all. If there is only one gradient stop specified, the brush is drawn as a solid color with the one color specified. Like other resource classes, the gradient stop class (example in the table below) is immutable.

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```
public class System.Windows.Media.GradientStop
{
    public GradientStop(Color color, float offset);

    public Color Color { get; }
    public AnimationEnumerator ColorAnimations { get; }
    public float Offset { get; }
    public AnimationEnumerator OffsetAnimations { get; }
}

public class System.Windows.Media.GradientStopBuilder : Builder
{
    public GradientStopBuilder();
    public GradientStopBuilder(Color color, float offset);

    public Color Color { get; set; }
    public AnimationList ColorAnimations { get; }
    public float Offset { get; set; }
    public AnimationList OffsetAnimations { get; }
    public GradientStop ToGradientStop();
}
```

[0097] There is also a collection class, as set forth in the following example:

```
public class System.Windows.Media.GradientStopCollection : ICollection
{
    public GradientStopCollection(); // empty list
    public GradientStopCollection(GradientStop[] GradientStops);
    public GradientStopCollection(ICollection c);

    // IEnumerable
    public IEnumerator GetEnumerator();

    // ICollection
    public void CopyTo(Array array, int index);
    public bool ICollection.IsSynchronized { get { return false; } }
```

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```

public int Count { get; }
public object ICollection.SyncRoot { get; }

5 // Extra functions
public GradientStop this[int index] { get; }
public bool Contains(GradientStop value);
public int IndexOf(GradientStop value); // returns first one
public int IndexOf(GradientStop value, int startIndex);
10 public int IndexOf(GradientStop value, int startIndex, int count);
public int LastIndexOf(GradientStop value);
public int LastIndexOf(GradientStop value, int startIndex);
public int LastIndexOf(GradientStop value, int startIndex, int count);
public GradientStopCollection GetRange(int index, int count);
}

15 public class System.Windows.Media.GradientStopCollectionBuilder : Builder,
    IList
{
    public GradientStopCollectionBuilder();
    public GradientStopCollectionBuilder(GradientStop [] GradientStops);
20 public GradientStopCollectionBuilder(ICollection c);
    public GradientStopCollectionBuilder(GradientStopCollection
        GradientStops);

    // IEnumerable
25 public IEnumerator GetEnumerator();

    // ICollection
    public void CopyTo(Array array, int index);
    public bool ICollection.IsSynchronized { get { return false; } }
    public int Count { get; }
30 public object ICollection.SyncRoot { get; }

    // IList
    public bool IsFixedSize { get { return false; } }
    public bool IsReadOnly { get { return false; } }
    public object IList.this [int index] { get; set; }
35 public int IList.Add(object value);
    public void Clear();
    public bool IList.Contains(object value);
    public int IList.IndexOf(object value); // returns first one
    public void IList.Insert(int index, object value);
40 public void IList.Remove(object value); // removes first one
    public void RemoveAt(int index);

    // Extra functions
    public GradientStop this [int index] { get; set; }
    public int Add(GradientStop value);
45 public bool Contains(GradientStop value);
    public int IndexOf(GradientStop value); // returns first one
    public int IndexOf(GradientStop value, int startIndex);
    public int IndexOf(GradientStop value, int startIndex, int count);
    public int LastIndexOf(GradientStop value);
50 public int LastIndexOf(GradientStop value, int startIndex);
    public int LastIndexOf(GradientStop value, int startIndex, int count);
    public void Insert(int index, GradientStop value);
    public void Remove(GradientStop value); // removes first one
    public void AddRange(ICollection c);

```

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```
public void InsertRange(int index, ICollection c);
public void RemoveRange(int index, int count);
public void SetRange(int index, ICollection c);
5 public GradientStopCollectionBuilder GetRange(int index, int count);

    // Capacity is a hint. It will throw an exception if it is set less
    // than Count.
    public int Capacity { get; set; }

10 // Builder overloads
    public override object Build();
    public override void ResetBuilder();
    public override void SetBuilder(Object example);

15 public GradientStopCollection ToGradientStopCollection();
}
```

[0098] As represented in the table below, the GradientSpreadMethod specifies how the gradient should be drawn outside of the specified vector or space. There are three values, including pad, in which the edge colors (first and last) are used to fill the remaining space, reflect, in which the stops are replayed in reverse order repeatedly to fill the space, and repeat, in which the stops are repeated in order until the space is filled:

```
public enum System.Windows.Media.GradientSpreadMethod
{
    Pad,
    Reflect,
    Repeat
}
```

[0099] FIG. 16 shows examples of the GradientSpreadMethod. Each shape has a linear gradient going from white to grey. The solid line represents the gradient vector.

[0100] The LinearGradient specifies a linear gradient brush along a vector. The individual stops specify colors stops along that vector. An example is shown in the table below:



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```

public class System.Windows.Media.LinearGradient : GradientBrush
{
    // Sets up a gradient with two colors and a gradient vector
    // specified to fill the object the gradient is applied to.
    // This implies ObjectBoundingBox for the GradientUnits
    // property
    public LinearGradient(Color color1, Color color2, float
        angle);

    public BrushMappingMode GradientUnits { get; }
    public Transform GradientTransform { get; }
    public GradientSpreadMethod SpreadMethod { get; }

    // Gradient Vector
    public Point VectorStart { get; }
    public PointAnimationCollection VectorStartAnimations { get; }
    public Point VectorEnd { get; }
    public PointAnimationCollection VectorEndAnimations { get; }

    // Gradient Stops
    public GradientStopCollection GradientStops { get; }
}

public class System.Window.Media.LinearGradientBuilder :
    GradientBrushBuilder
{
    public LinearGradientBuilder();
    public LinearGradientBuilder(Color color1, Color color2, float
        angle);
    public LinearGradientBuilder(LinearGradient lg);

    // GradientUnits: Default is ObjectBoundingBox
    public BrushMappingMode GradientUnits { get; set; }
    // GradientTransform: Default is identity
    public Transform GradientTransform { get; set; }
    // SpreadMethod: Default is Pad
    public GradientSpreadMethod SpreadMethod { get; set; }

    // Gradient Vector
    // Default vector is (0,0) - (1,0)
    public Point VectorStart { get; set; }
    public PointAnimationCollectionBuilder VectorStartAnimations {
        get; set; }
    public Point VectorEnd { get; set; }
    public PointAnimationCollectionBuilder VectorEndAnimations { get; set; }
}

// Gradient Stops
public void AddStop(Color color, float offset);
public GradientStopCollectionBuilder GradientStops { get;
set; }

```

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}

[0101] The RadialGradient is similar in programming model to the linear gradient. However, whereas the linear gradient has a start and end point to define the gradient vector, the radial gradient has a circle along with a focal point to define the gradient behavior. The circle defines the end point of the gradient, that is, a gradient stop at 1.0 defines the color at the circle. The focal point defines center of the gradient. A gradient stop at 0.0 defines the color at the focal point.

[0102] FIG. 17 shows a radial gradient that from white to grey. The outside circle represents the gradient circle while the dot denotes the focal point. This example gradient has its SpreadMethod set to Pad:

```
public class System.Windows.Media.RadialGradient : GradientBrush
{
    // Sets up a gradient with two colors.
    // This implies ObjectBoundingBox for the GradientUnits
    // property along with a center at (0.5,0.5)
    // a radius of 0.5 and a focal point at (0.5,0.5)
    public RadialGradient(Color color1, Color color2);

    public BrushMappingMode GradientUnits { get; }
    public Transform GradientTransform { get; }
    public GradientSpreadMethod SpreadMethod { get; }

    // Gradient definition
    public Point CircleCenter { get; }
    public PointAnimationCollection CircleCenterAnimations { get; }
    public float CircleRadius { get; }
    public FloatAnimationCollection CircleRadiusAnimations { get; }
    public Point Focus { get; }
    public PointAnimationCollection FocusAnimations { get; }

    // Gradient Stops
    public GradientStopCollection GradientStops { get; }
}
```

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```

5 public class System.Windows.Media.RadialGradientBuilder :
    GradientBrushBuilder
{
    public RadialGradientBuilder();
    public RadialGradient(Color color1, Color color2);
    public RadialGradientBuilder(RadialGradient rg);

10 // GradientUnits: Default is ObjectBoundingBox
    public BrushMappingMode GradientUnits { get; set; }
    // GradientTransform: Default is identity
    public Transform GradientTransform { get; set; }
    // SpreadMethod: Default is Pad
    public GradientSpreadMethod SpreadMethod { get; set; }

15 // Gradient definition
    public Point CircleCenter { get; set; } // Default: (0.5, 0.5)
    public PointAnimationCollectionBuilder CircleCenterAnimations { get;
        set; }
    public float CircleRadius { get; set; } // Default: 0.5
20 public FloatAnimationCollectionBuilder CircleRadiusAnimations {
    get; set; }
    public Point Focus { get; set; } // Default: (0.5, 0.5)
    public PointAnimationCollectionBuilder FocusAnimations { get; set; }

25 // Gradient Stops
    public void AddStop(Color color, float offset);
    public GradientStopCollectionBuilder GradientStops { get; set; }
}

```

30 **[0103]** Another brush object represented in FIG. 15 is a VisualBrush object. Conceptually, the VisualBrush provides a way to have a visual drawn in a repeated, tiled fashion as a fill. Visual paint objects also provide a mechanism for markup language to directly work with the API layer at a resource level, as described below. An example of such a fill is represented in FIG. 14 by the visual brush referencing a visual (and any child visuals) that specifies a single circular shape 1420, with that circular shape filling a rectangle 1422. Thus, the VisualBrush object may reference a visual to

35 define how that brush is to be drawn, which introduces a type of multiple use for visuals. In this manner, a program may use an arbitrary graphics "metafile" to fill an area via a brush or pen. Since this is a compressed form for storing and using arbitrary graphics, it serves as a graphics resource. The following sets forth an example VisualBrush object:

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```

public class System.Windows.Media.VisualBrush : Brush
{
    public VisualBrush(Visual v);

    public BrushMappingMode DestinationUnits { get; }
    public BrushMappingMode ContentUnits { get; }
    public Transform Transform { get; }

    public Rect ViewBox { get; }
    public Stretch Stretch { get; }
    public HorizontalAlign HorizontalAlign { get; }
    public VerticalAlign VerticalAlign { get; }

    public Point Origin { get; }
    public PointAnimationCollection OriginAnimations { get; }
    public Size Size { get; }
    public SizeAnimationCollection SizeAnimations { get; }

    // Visual
    public Visual Visual { get; }
}

public class System.Windows.Media.VisualBrushBuilder : BrushBuilder
{
    public VisualBrushBuilder();
    public VisualBrushBuilder(Visual v);
    public VisualBrushBuilder(VisualBrush vb);

    // DestinationUnits: Default is ObjectBoundingBox
    public BrushMappingMode DestinationUnits { get; set; }
    // ContentUnits: Default is ObjectBoundingBox
    public BrushMappingMode ContentUnits { get; set; }
    // Transform: Default is Identity
    public Transform Transform { get; set; }
    // ViewBox: Default is (0,0,0,0) -- unset and ignored
    public Rect ViewBox { get; set; }
    // Stretch: Default is None -- and ignored
    // because the ViewBox is not set
    public Stretch Stretch { get; set; }
    // HorizontalAlign: Default is Center and ignored
    public HorizontalAlign HorizontalAlign { get; set; }
    // VerticalAlign: Default is Center and ignored
    public VerticalAlign VerticalAlign { get; set; }

    // Origin: Default is (0,0)
    public Point Origin { get; set; }
    public PointAnimationCollectionBuilder OriginAnimations { get; set; }
    // Size: Default is (1,1)
    public Size Size { get; set; }
    public SizeAnimationCollectionBuilder SizeAnimations { get; set; }

    // Visual: Default is null -- nothing drawn
    public Visual Visual { get; set; }
}

```

**[0104]** A VisualBrush's contents have no intrinsic bounds, and effectively describe an infinite plane. These contents exist in their own coordinate space, and the space which is being filled by the VisualBrush is the local coordinate space at the time of application. The content space is mapped into the local space based on the ViewBox, ViewPort, Alignments and Stretch properties. The ViewBox is specified in content space, and this rectangle is mapped into the ViewPort (as specified via the Origin and Size properties) rectangle.

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**[0105]** The ViewPort defines the location where the contents will eventually be drawn, creating the base tile for this Brush. If the value of DestinationUnits is UserSpaceOnUse, the Origin and Size properties are considered to be in local space at the time of application. If instead the value of DestinationUnits is ObjectBoundingBox, then an Origin and Size are considered to be in the coordinate space, where 0,0 is the top/left corner of the bounding box of the object being brushed, and 1,1 is the bottom/right corner of the same box. For example, consider a RectangleGeometry being filled which is drawn from 100,100 to 200,200. In such an example, if the DestinationUnits is UserSpaceOnUse, an Origin of 100,100 and a Size of 100,100 would describe the entire content area. If the DestinationUnits is ObjectBoundingBox, an Origin of 0,0 and a Size of 1,1 would describe the entire content area. If the Size is empty, this Brush renders nothing.

**[0106]** The ViewBox is specified in content space. This rectangle is transformed to fit within the ViewPort as determined by the Alignment properties and the Stretch property. If the Stretch is none, then no scaling is applied to the contents. If the Stretch is Fill, then the ViewBox is scaled independently in both X and Y to be the same size as the ViewPort. If the Stretch is Uniform or UniformToFill, the logic is similar but the X and Y dimensions are scaled uniformly, preserving the aspect ratio of the contents. If the Stretch is Uniform, the ViewBox is scaled to have the more constrained dimension equal to the ViewPort's size. If the Stretch is UniformToFill, the ViewBox is scaled to have the less constrained dimension equal to the ViewPort's size. In other words, both Uniform and UniformToFill preserve aspect ratio, but Uniform ensures that the entire ViewBox is within the ViewPort (potentially leaving portions of the ViewPort uncovered by the ViewBox), and UniformToFill ensures that the entire ViewPort is filled by the ViewBox (potentially causing portions of the ViewBox to be outside the ViewPort). If the ViewBox is empty, then no Stretch will apply. Note that alignment will still occur, and it will position the "point" ViewBox.

**[0107]** FIG. 18 provides representations of a single tile 1800 of graphics rendered with various stretch settings, including a tile 800 when stretch is set to "none." The tile 1802 is a representation of when the stretch is set to "Uniform," the tile 1804 when stretch is set to "UniformToFill," and the tile 1806 when stretch is set to "Fill."

**[0108]** Once the ViewPort is determined (based on DestinationUnits) and the ViewBox's size is determined (based on Stretch), the ViewBox needs to be positioned within the ViewPort. If the ViewBox is the same size as the ViewPort (if Stretch is Fill, or if it just happens to occur with one of the other three Stretch values), then the ViewBox is positioned at the Origin so as to be identical to the ViewPort. Otherwise, HorizontalAlignment and VerticalAlignment are considered. Based on these properties, the ViewBox is aligned in both X and Y dimensions. If the HorizontalAlignment is Left, then the left edge of the ViewBox will be positioned at the Left edge of the ViewPort. If it is Center, then the center of the ViewBox will be positioned at the center of the ViewPort, and if Right, then the right edges will meet. The process is repeated for the Y dimension.

**[0109]** If the ViewBox is (0,0,0,0), it is considered unset, whereby ContentUnits are considered. If the ContentUnits are UserSpaceOnUse, no scaling or offset occurs, and the contents are drawn into the ViewPort with no transform. If the ContentUnits are ObjectBoundingBox, then the content origin is aligned with the ViewPort Origin, and the contents are scale by the object's bounding box's width and height.

**[0110]** When filling a space with a VisualBrush, the contents are mapped into the ViewPort as above, and clipped to the ViewPort. This forms the base tile for the fill, and the remainder of the space is filled based on the Brush's TileMode. Finally, if set, the Brush's transform is applied - it occurs after all the other mapping, scaling, offsetting, etc.

**[0111]** The TileMode enumeration is used to describe if and how a space is filled by its Brush. A Brush which can be tiled has a tile rectangle defined, and this tile has a base location within the space being filled. The rest of the space is filled based on the TileMode value. FIG. 19 provides a representation of example graphics with various TileMode settings, including "None" 1900, "Tile" 1092, "FlipX" 1904, "FlipY" 1906 and "FlipXY" 1908. The top left-most tile in the various example graphics comprises the base tile.

**[0112]** FIG. 20 represents a process for generating the pixels for this brush. Note that the logic described in FIG. 20 is only one possible way to implement of the logic, and it should be understood that other ways, including more efficient ways, are feasible. For example, there are likely more efficient ways processing the data, e.g., such that the content is not drawn for each repetition, with the tile drawn and cached. However, FIG. 20 provides a straightforward description.

**[0113]** In general, each time the contents of the pattern are drawn, a new coordinate system is created. The origin and offset of each repetition is specified by the Origin and Size properties, as filtered through the DestinationUnits and Transform properties.

**[0114]** A coordinate frame is set up based on the DestinationUnits property. To this end, if at step 2000, the DestinationUnits property is UserSpaceOnUse, the current coordinate frame at the time the brush was used is the starting coordinate frame, via step 2002. If instead at step 2004 the property is ObjectBoundingBox, the bounding box of the geometry to which this brush is applied is used, as represented by step 2004, to set a new coordinate frame such that the upper left corner of the bounding box maps to (0,0) and the lower left corner of the bounding box maps to (1,1). In either case, at step 2006 the Transform property is applied to this coordinate frame, which essentially defines a grid.

**[0115]** FIG. 21 represents a VisualBrush Grid that is defined for the tiles in a VisualBrush. The first circle is a simple grid, and the second has a Transform with a Skew in the x direction of 47.

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[0116] At step 2008, the visual is drawn into each cell of the grid, as represented in FIG. 22, where the visual draws the appropriate data. If at step 2010 there is a ViewBox specified, the Visual is fitted into the grid cell as specified by the ViewBox, Stretch, HorizontalAlign and VerticalAlign attributes, via step 2012. The DestinationUnits and Transform properties are used to apply the correct transform such that the visual lines up in the grid box.

[0117] If there is no ViewBox specified, then a new coordinate system is established for drawing the content at step 2014.

[0118] The coordinate frame is set such that its origin is at the Origin point for that particular grid cell being drawn.

[0119] A clip is applied at step 2018 based on the Size property such that this tile will not draw outside of the bounds of the cell. The Origin and Size are modified appropriately based on the DestinationUnits property.

[0120] The coordinate system is then modified, based on the SourceUnits property. To this end, if at step 2020 the SourceUnits property is ObjectBoundingBox, the appropriate scaling transform is applied at step 2026, otherwise it is UserSpaceOnUse, and no new transform is applied. The Transform property is applied at step 2024, and the content is drawn at step 2026.

[0121] Note that if any part of size is zero, nothing is drawn, and if Stretch is "None," the transform for the viewbox is set up such that one unit in the new coordinate frame is equal to one unit in the old coordinate frame. The transform essentially becomes an offset based on the align attributes and the size of the ViewBox. As described above at steps 2010 and 2012, Stretch and the alignment properties only apply when there is a ViewBox specified. The ViewBox specifies a new coordinate system for the contents, and Stretch helps to specify how those contents map into the ViewBox. The alignment options align the ViewBox, not the contents. Thus, for example, if the viewbox is set to "0 0 10 10" and something is drawn at -10,-10 and aligned to the upper left corner, that thing will be clipped out.

[0122] Returning to FIG. 15, image brush can be thought of as a special case of VisualBrush. Although a program can create a visual, put an image into it and attach it to VisualBrush, the API for doing so would be cumbersome. Since there is no necessary content coordinate frame, the ViewBox and ContentUnits property members no longer apply.

```
public class System.Windows.Media.ImageBrush : Brush
{
    public ImageBrush(ImageData image);

    public BrushMappingMode DestinationUnits { get; }
    public Transform Transform { get; }

    public Stretch Stretch { get; }
    public HorizontalAlign HorizontalAlign { get; }
    public VerticalAlign VerticalAlign { get; }

    public Point Origin { get; }
    public PointAnimationCollection OriginAnimations { get; }
    public Size Size { get; }
    public SizeAnimationCollection SizeAnimations { get; }

    public ImageData ImageData { get; }
}

public class System.Windows.Media.ImageBrushBuilder : BrushBuilder
{
    public ImageBrushBuilder();
    public ImageBrushBuilder(ImageData image);
    public ImageBrushBuilder(ImageBrush ib);
```

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```

// DestinationUnits: Default is ObjectBoundingBox
public BrushMappingMode DestinationUnits { get; set; }
// Transform: Default is identity
public Transform Transform { get; set; }

// Stretch: Default is None
public Stretch Stretch { get; set; }
// HorizontalAlign: Default is Center
public HorizontalAlign HorizontalAlign { get; set; }
// VerticalAlign: Default is Center
public VerticalAlign VerticalAlign { get; set; }

// Origin: Default is (0,0)
public Point Origin { get; set; }
public PointAnimationCollectionBuilder OriginAnimations { get; set; }

// Size: Default is (1,1)
public Size Size { get; set; }
public SizeAnimationCollectionBuilder SizeAnimations { get; set; }

// ImageData: Default is null -- nothing drawn
public ImageData ImageData { get; set; }
}

```

**[0123]** NineGridBrush is very similar to ImageBrush except the image is warped based on the size. In essence, NineGridBrush may be thought of a custom type of Stretch, in which certain parts of the image stretch, while others (e.g., borders) do not. Thus, while the Size of the image in the ImageBrush will cause a simple scale, the NineGridBrush will produce a non-uniform scale up to the desired size. The units for the non-scaled areas are the user units when the brush is applied, which means that ContentUnits (if it existed for NineGridBrush) would be set to UserUnitsOnUse. The Transform property of the Brush can be used effectively. Note that the border members count in from the edge of the image.

**[0124]** By way of example, FIG. 23 represents a nine-grid image being enlarged from a first instance 2302 to a second instance 2304, with four types of areas. As represented in FIG. 23, to keep the border the same, the areas marked "a" expand horizontally, the areas marked "b" expand vertically, the areas marked "c" expand horizontally and vertically, and the areas marked "d" do not change in size.

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```

public class System.Windows.Media.NineGridBrush : Brush
{
    public NineGridBrush(ImageData image,
        int LeftBorder, int RightBorder,
        int TopBorder, int BottomBorder);

    public BrushMappingMode DestinationUnits { get; }
    public Transform Transform { get; }

    public Point Origin { get; }
    public PointAnimationCollection OriginAnimations { get; }
    public Size Size { get; }
    public SizeAnimationCollection SizeAnimations { get; }

    public int LeftBorder { get; }
    public int RightBorder { get; }
    public int TopBorder { get; }
    public int BottomBorder { get; }

    public ImageData ImageData { get; }
}

public class System.Window.Media.NineGridBrushBuilder : BrushBuilder
{
    public NineGridBrushBuilder();
    public NineGridBrushBuilder (ImageData image,
        int LeftBorder, int RightBorder,
        int TopBorder, int BottomBorder);
    public NineGridBrushBuilder (NineGridBrush ngb);

    // DestinationUnits: Default is ObjectBoundingBox
    public BrushMappingMode DestinationUnits { get; set; }
    // Transform: Default is identity
    public Transform Transform { get; set; }

    // Origin: Default is (0,0)
    public Point Origin { get; set; }
    public PointAnimationCollectionBuilder OriginAnimations { get;
        set; }

    // Size: Default is (1,1)
    public Size Size { get; set; }
    public SizeAnimationCollectionBuilder SizeAnimations { get; set; }

    // *Border: default to 0

    public int LeftBorder { get; set; }
    public int RightBorder { get; set; }
    public int TopBorder { get; set; }
    public int BottomBorder { get; set; }

    // ImageData: Default is null -- nothing drawn
    public ImageData ImageData { get; set; }
}

```

[0125] As generally described above, the graphics object model of the present invention includes a Transform object



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model, which includes the types of transforms represented in the hierarchy of FIG. 24, under a Transform base class. These different types of components that make up a transform may include TransformList, TranslateTransform, RotateTransform, ScaleTransform, SkewTransform, and MatrixTransform. Individual properties can be animated, e.g., a program developer can animate the Angle property of a RotateTransform.

**[0126]** Matrices for 2D computations are represented as a 3x3 matrix. For the needed transforms, only six values are needed instead of a full 3x3 matrix. These are named and defined as follows.

$$\begin{bmatrix} m00 & m01 & 0 \\ m10 & m11 & 0 \\ m20 & m21 & 1 \end{bmatrix}$$

**[0127]** When a matrix is multiplied with a point, it transforms that point from the new coordinate system to the previous coordinate system:

$$\begin{bmatrix} x_{\text{newCoordSys}} & y_{\text{newCoordSys}} & 1 \end{bmatrix} \cdot \begin{bmatrix} m00 & m01 & 0 \\ m10 & m11 & 0 \\ m20 & m21 & 1 \end{bmatrix} = \begin{bmatrix} x_{\text{oldCoordSys}} & y_{\text{oldCoordSys}} & 1 \end{bmatrix}$$

**[0128]** Transforms can be nested to any level. Whenever a new transform is applied it is the same as post-multiplying it onto the current transform matrix:

$$\begin{bmatrix} x_{\text{newCoordSys}} & y_{\text{newCoordSys}} & 1 \end{bmatrix} \cdot \begin{bmatrix} m00_2 & m01_2 & 0 \\ m10_2 & m11_2 & 0 \\ m20_2 & m21_2 & 1 \end{bmatrix} \cdot \begin{bmatrix} m00_1 & m01_1 & 0 \\ m10_1 & m11_1 & 0 \\ m20_1 & m21_1 & 1 \end{bmatrix} = \begin{bmatrix} x_{\text{oldCoordSys}} & y_{\text{oldCoordSys}} & 1 \end{bmatrix}$$

**[0129]** Most places in the API do not take a Matrix directly, but instead use the Transform class, which supports animation.

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```
public struct System.Windows.Media.Matrix
{
    // Construction and setting
    public Matrix(); // defaults to identity

    public Matrix(
        double m00, double m01,
        double m10, double m11,
        double m20, double m21);

    // Identity
    public static readonly Matrix Identity;
    public void SetIdentity();
    public bool IsIdentity { get; }

    public static Matrix operator *(Matrix matrix1, Matrix
        matrix2);
    public static Point operator *(Matrix matrix, Point point);

    // These function reinitialize the current matrix with
    // the specified transform matrix.
    public void SetTranslation(double dx, double dy);
    public void SetTranslation(Size offset);
    public void SetRotation(double angle); // degrees
    public void SetRotation(double angle, Point center); // degrees
    public void SetRotationRadians(double angle);
    public void SetRotationRadians(double angle, Point center);
    public void SetScaling(double sx, double sy);
```

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```

public void SetScaling(double sx, double sy, Point center);
public void SetSkewX(double angle); // degrees
public void SetSkewY(double angle); // degrees
public void SetSkewXRadians(double angle);
public void SetSkewYRadians(double angle);

// These function post-multiply the current matrix
// with the specified transform
public void ApplyTranslation(double dx, double dy);
public void ApplyTranslation(Size offApply);
public void ApplyRotation(double angle); // degrees
public void ApplyRotation(double angle, Point center); //
degrees
public void ApplyRotationRadian(double angle);
public void ApplyRotationRadian(double angle, Point center);
public void ApplyScaling(double sx, double sy);
public void ApplyScaling(double sx, double sy, Point center);
public void ApplySkewX(double angle); // degrees
public void ApplySkewY(double angle); // degrees
public void ApplySkewXRadians(double angle);
public void ApplySkewYRadians(double angle);
public void ApplyMatrix(Matrix matrix);

// Inversion stuff
public double Determinant { get; }
public bool IsInvertible { get; }
public void Invert(); // Throws ArgumentException if
!IsInvertible
public static Matrix Invert(Matrix matrix);

// Individual members
public double M00 { get; set; }
public double M01 { get; set; }
public double M10 { get; set; }
public double M11 { get; set; }
public double M20 { get; set; }
public double M21 { get; set; }
};

```

MARKUP LANGUAGE AND OBJECT MODEL FOR VECTOR GRAPHICS

**[0130]** In accordance with an aspect of the present invention, a markup language and element object model are provided to enable user programs and tools to interact with the scene graph data structure 216 without requiring a specific knowledge of the details of the API layer 212 (FIG. 2). In general, a vector graphics markup language is provided, which comprises an interchange format, along with a simple markup based authoring format for expressing vector graphics via the element object model. Via this language, markup (e.g., HTML or XML-type content) may be programmed. Then, to build the scene graph, the markup is parsed and translated into the appropriate visual API layer objects that were as described above. At this higher operating level, an element tree, the property system and the presenter system are provided to handle much of the complexity, making it straightforward for scene designers to design possibly complex scenes.

**[0131]** In general, the vector graphics system generally provides a set of shape and other elements, integration with a general property system, a grouping and compositing system, and a two-tiered (element level and resource level) approach so that the user can program in a way that matches flexibility and performance needs. In keeping with one aspect of the present invention, the element object model for dealing with vector graphics correlates with the scene graph object model. In other words, the vector graphics system and the Visual API layer share a set of resources at the element object model level, e.g., the Brush object is used when drawing at the Visual API and it is also the type of the fill property on Shape. Thus, in addition to having elements that correlate with the scene graph objects, the markup

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language shares a number of primitive resources (e.g., brushes, transforms, and so forth) with the Visual API layer. The vector graphics system also exposes and extends the animation capabilities of the Visual API layer, which is largely shared between the levels.

5 [0132] Further, as described below, the vector graphics system can program to different profiles, or levels, including an element level and a resource level. In the element level, each of the drawing shapes is represented as an element at the same level as the rest of the programmable elements in a page/screen. This means that the shapes interact in a full way with the presenter system, events and properties. In the resource level, the vector graphics systems operates in a pure resource format, similar to a traditional graphics metafile. The resource level is efficient, but has somewhat limited support for cascaded properties, eventing and fine-grained programmability. The scene designer thus has the ability to balance efficiency with programmability as needed.

10 [0133] In keeping with one aspect of the present invention, the vector graphics system at the resource level also correlates to the visual API layer, in that the resource level markup, in one implementation, is expressed as a VisualBrush. When the resource markup is parsed, a visual object is created. The visual object is set into a VisualBrush which may be used by shapes, controls and other elements at the element level.

15 [0134] FIG. 25 is a representation of the element class hierarchy 2500. The classes of the markup language object model of the present invention are represented via shadowed boxes, and include a shape class 2502, an image class 2504, a video class 2506 and a canvas class 2508. Elements of the shape class include rectangle 2510, polyline 2512, polygon 2514, path 2516, line 2518 and ellipse 2520. Note that in some implementations, a circle element may not be present as indicated by the dashed box 2522 in FIG. 25, however for purposes of the various examples herein, the circle element 2522 will be described. Each element may include or be associated with fill (property) data, stroke data, clipping data, transform data, filter effect data and mask data.

20 [0135] As described below, shapes correspond to geometry that is drawn with inherited and cascaded presentation properties. The presentation properties are used to construct the pen and the brush needed to draw the shapes. In one implementation, shapes are full presenters, like other control elements. However, in other implementations, a canvas class 2508 may be provided as a container for shapes, and shapes can only be drawn when in a canvas element. For example, to keep shapes lightweight, shapes may not be allowed to have attached presenters. Instead, the canvas has an attached presenter and draws the shapes. Canvas elements are described in more detail below.

25 [0136] As also described below, the image class is more specific than a shape, and for example can include border data, which may be complex. For example, a border can be specified as one color on the top, a different color on the sides, with possibly various thicknesses specified and other properties set. Position, size rotation and scale may be set for an image or similar boxed element, such as text or video. Note that the image and video elements can exist and be shown outside of a canvas element, and also inherit from BoxedElement, e.g., to get the background, borders and padding support from that element.

30 [0137] The video element allows video (or similar multimedia) to be played within a displayed element. In this manner, the vector graphics system provides a markup interface to the API layer that is seamlessly consistent across multimedia, including text, 2D graphics, 3D graphics, animation, video, still images and audio. This allows designers to that learn to work with one media to easily integrate other media into applications and documents. The vector graphics system also enables multimedia to be animated in the same way as other elements, again allows designers the ability to use multimedia like other elements, yet without sacrificing the core intrinsic uniqueness of each individual media type. For example, a designer can use the same naming scheme for rotating, scaling, animating, drawing, compositing and other effects across different media types, whereby designers may easily create very rich applications, as well as allowing for a very efficient rendering and compositing implementation to be built underneath.

35 [0138] FIG. 26 represents one implementation in which the markup code 2602 is interpreted by a parser / translator 2604. In general, the parser / translator 2604 adds elements to an element tree / property system 208 (also represented in FIG. 2) and attaches presenters to those elements. The presenter system 210 then takes the element tree 210 with the attached presenters and translates the data to objects and calls to the visual API layer 212. Note that not all elements need to be translated, only those with attached presenters.

40 [0139] In general, an element is an object in the element layer that participates in the property system, eventing and layout/presentation system. The parser finds tags and decides if those tags help to define an element or a resource object. In the special case of a VisualBrush, the same tags may be interpreted as elements or also interpreted as resource objects, depending on the context of where those tags appear, e.g., depending on whether appearing in complex property syntax or not.

45 [0140] In accordance with one aspect of the present invention, the markup language provides distinct ways to describe a resource, including a simple string format or a complex object notation. For a simple string format, the parser / translator 2604 uses a type converter 2608 for converting a string to an appropriate visual API object. By way of example, in the following line of markup, the Fill property value can be converted to a brush object, via the type converter 2608:

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```
<Circle CenterX="10" CenterY="10" Radius="5" Fill="Red" />
```

As can be readily appreciated, the conversion of such an inline line of tag-based markup with simple strings of parameters to a brush object is straightforward, and provides a simple way for a scene designer to add a shape and its attributes to a scene.

**[0141]** However there are times when the fill attribute is too complex to fit into a single string. In such a situation, complex property syntax, which may be inline in the markup, is used to set this property. For example, the following complex property syntax fills a circle with a gradient rather than a solid color, specifying the colors at various gradient stops (which can range from 0 to 1):

```
<Circle CenterX="10" CenterY="10" Radius="5">
  <Circle.Fill>
    <LinearGradient>
      <GradientStop Color="Red" Offset="0"/>
      <GradientStop Color="Blue" Offset="0.33"/>
      <GradientStop Color="Green" Offset="0.66"/>
      <GradientStop Color="Red" Offset="1.0"/>
    </LinearGradient>
  </Circle.Fill>
```

```
</Circle>
```

**[0142]** In addition to being present inline in the markup, a resource instance may be located elsewhere (e.g., in the markup or in a file, which can be local or on a remote network and appropriately downloaded), and referenced by a name, (e.g., a text name, reference or other suitable identifier). In this manner, a scene designer can reuse an element in the element tree throughout a scene, including elements described by the complex property syntax.

**[0143]** The parser handles markup in the complex property syntax by accessing the type converter 2608 as necessary, and also matching specified parameters to the object properties, thereby handling the complexity for the scene designer. Thus, the parser does not just set up the objects, but also sets attributes on the objects. Note that the parser actually instantiates a builder to create the objects, since objects are immutable.

**[0144]** Because the same rendering model is shared between the element level and the API level, many of the objects are essentially the same. This makes parsing / translation highly efficient, and also allows different types of programming languages (e.g., C#-like languages) the ability to easily convert from the markup to its own syntax, and vice-versa. Note that as represented in FIG. 26, another such programming language 2610 can add elements to the element tree 208, or can directly interface with the visual API layer 212.

**[0145]** As also represented in FIG. 26 and in accordance with an aspect of the present invention, the same markup 2602 may be used to program at an element level and a resource level. As described above, the element level gives the scene designer full programmability, usage of the property system that provides inheritance (e.g., style-sheet like

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features), and eventing (e.g., whereby an element may have attached code to change its appearance, position and so forth in response to a user input event). However, the present invention also provides a resource-level mechanism by which scene designers can essentially shortcut the element tree and presenter system and program directly to the visual API layer. For many types of static shapes, images and the like where element-level features are not needed, this provides a more efficient and lightweight way to output the appropriate object. To this end, the parser recognizes when a fill of type "visual brush" is present, and directly calls the API layer 212 with resource level data 2612 to create the object. In other words, as represented in FIG.22, element level vector graphics get parsed into created elements, which need later translation to the objects, while resource level vector graphics get parsed and directly stored in an efficient manner.

[0146] By way of example, the following markup is directly derived from the object model for the LinearGradient object, and fills an outer circle with a VisualBrush. The contents of that VisualBrush are defined by the inner markup. Note that this syntax is commonly used for expressing various brushes, transforms and animations:

```
<Circle CenterX="10" CenterY="10" Radius="5">
  <Circle.Fill>
    <VisualBrush xmlns="...">
      <Circle CenterX="0.5" CenterY="0.5" Radius="0.25" Fill="Blue"/>
      <Circle CenterX="0.6" CenterY="0.6" Radius="0.25" Fill="Green"/>
      <Circle CenterX="0.7" CenterY="0.7" Radius="0.25" Fill="Red"/>
      <Circle CenterX="0.8" CenterY="0.8" Radius="0.25" Fill="LemonChiffon"/>
    </VisualBrush>
  </Circle.Fill>
</Circle>
```

[0147] Note that while these visual brush-filled objects are efficiently stored, the resource level data (or the objects created thereby) can be referenced by elements and part of the element tree 208, as generally represented in FIG. 26. To this end, these visual brush resources may be named (e.g., with a name, reference or other suitable identifier) and referenced like other resources described via the complex property syntax.

[0148] Turning to an explanation of the canvas, as mentioned above in one alternative implementation, shapes may be kept lightweight and thus may be required to be contained in a canvas. In this alternative implementation, when content is rendered, it is rendered onto an infinite, device-independent canvas which has an associated coordinate system. The canvas element may thus position content according to absolute coordinates. The canvas element can optionally define a viewport, which specifies clipping, a transform, a preferred aspect ratio and a way of mapping the viewport into a parent space. If there is no viewport established, the canvas element only specifies a grouping of drawing primitives and can set up a transform, opacity and other compositing attributes.

[0149] The following is a markup example for a sample canvas:

```
<Canvas Background="black" Top="100" Left="100" Height="600" Width="800">
  <Rectangle Top="600" Left="100" Width="100" Height="50" Fill="red"
  Stroke="blue" StrokeWidth="10"/>
  <Line x1="100" y1="300" x2="300" y2="100" Stroke="green" StrokeWidth="5"
/>
</Canvas>
```

[0150] Note that in one implementation, when coordinates are specified without units then they are considered as "logical pixels" of 96ths of an inch, and in the above example, the line will be 200 pixels long. In addition to coordinates, other properties include width, height horizontal and vertical alignment, and ViewBox (of type rect; default is unset or (0,0,0,0), meaning no adjustment is made, and the stretch and align properties get ignored). As generally described above with reference to FIGS. 18-20, other properties include stretch, which when not specified preserves original size, or can 1) specify a fill in which the aspect ratio is not preserved and the content is scaled to fill the bounds established by the top/left/width/height, 2) specify uniform, which scales size uniformly until the image fits the bounds established by the top/left/width/height, or 3) specify UniformToFill, which scales size uniformly to fill the bounds established by top/left/width/height, and clips as necessary.

[0151] To further correlate with the lower-level object model, the transform property establishes a new coordinate

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frame for the children of the element, while the clip property restricts the region to which content can be drawn on the canvas, with the default clipping path defined as the bounding box. The ZIndex property can be used to specify rendering order for nested canvas elements within a panel.

[0152] The Viewbox specifies a new coordinate system for the contents, e.g., by redefining the extent and origin of the viewport. Stretch helps to specify how those contents map into the viewport. The value of the viewBox attribute is a list of four "unitless" numbers <min-x>, <min-y>, <width> and <height>, e.g., separated by whitespace and/or a comma, and is of type Rect. The Viewbox rect specifies the rectangle in user space that maps to the bounding box. It works the same as inserting a scaleX and scaleY. The stretch property (in case the option is other than none) provides additional control for preserving the aspect ratio of the graphics. An additional transformation is applied to descendants of the given element to achieve the specified effect.

[0153] In the example above, the effective result of the rectangle in the markup sample above under each stretch rule would be:

None - from (100,600) to (200,650)

Fill - from (100,100) to (900,700)

Uniform - from (100,?) to (900,?) - the new height will be 400, and it will be centered based on HorizontalAlign and VerticalAlign.

UniformToFill - from (?,100) to (?,700) The new width is 1200, and will again be centered based on HorizontalAlign and VerticalAlign.

[0154] If there is a transform on the canvas, it is essentially applied above (e.g., in the tree) the mapping to ViewBox. Note that this mapping will stretch any of the elements in a canvas, e.g., boxes, text, and so forth, not just shapes. Further, note that if a viewbox is specified, the canvas no longer sizes to its contents, but rather has a specified size. If x-width and x-height are also specified, then the stretch/align properties are used to fit the viewbox into the specified width and height.

[0155] The elements in the object model can each have a 'Clip' attribute applied. On some elements, notably shapes, this is exposed directly as a common language runtime property, while on others (e.g., most controls) this property is set via a DependencyProperty.

[0156] In general, the clipping path restricts the region to which content can be drawn, as generally represented in FIG. 27 wherein a button is shown in an unclipped form 2702 and a form 2704 in which a clipping path is specified (where the dashed line represents the clipping path). Conceptually, any parts of the drawing that lie outside of the region bounded by the currently active clipping path are not drawn. A clipping path can be thought of as a mask wherein those pixels outside the clipping path are black with an alpha value of zero and those pixels inside the clipping path are white with an alpha value of one (with the possible exception of anti-aliasing along the edge of the silhouette).

[0157] A clipping path is defined by a Geometry object, either inline or more typically in a resource section. A clipping path is used and/or referenced using the "Clip" property on an element, as shown in the following example:



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```
5  <def:Resources>
    <Geometry def:ID="MyClip">
        <Path Data="..." />
        <Rectangle ... />
    </Geometry>
10 </def:Resources>
    <Element Clip=""%resource; MyClip" ... />
```

15 [0158] Note that animating a Clip is similar to animating transforms:

```
20 <Element>
    <Element.Clip>
        <Circle .../>
        <Rectangle ... >
            <FloatAnimation ... />
        </Rectangle>
25 </Element.Clip>
    ... children ...
</Element>
```

30 [0159] A path is drawn by specifying the 'Geometry' data and the rendering properties, such as Fill, Stroke, and StrokeWidth on the Path element. An example markup for a path is specified as follows:

```
35 <Path Data="M 100 100 L 300 100 L 200 300 z"
    Fill="red" Stroke="blue" StrokeWidth="3" />
```

40 [0160] The path 'Data' string is of type Geometry. A more verbose and complete way to specify a drawn path is via the complex property syntax, as described above. The markup (such as in the following example) is fed directly into the Geometry builder classes described above:

```
45 <Path>
    <Path.Data>
        <CircleGeometry ... />
50 <RectangleGeometry ... />
        <PathGeometry ... />
    </Path.Data>
    <Path.Fill value="red" />
55 <Path.Stroke value="blue"/>
</Path>
```



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[0161] The path data string is also described, using the following notation to describe the grammar for a path data string:

```
*: 0 or more
+: 1 or more
?: 0 or 1
(): grouping
|: separates alternatives
double quotes surround literals
```

[0162] The following shows the path data string information described with this notation (note that in one implementation, FillMode may be specified here, instead of a property at the element level):

```
wvg-path:
  wsp* moveto-drawto-command-groups? wsp*

moveto-drawto-command-groups:
  moveto-drawto-command-group
  | moveto-drawto-command-group wsp* moveto-drawto-command-
groups

moveto-drawto-command-group:
  moveto wsp* drawto-commands?

drawto-commands:
  drawto-command
  | drawto-command wsp* drawto-commands

drawto-command:
  closepath
  | lineto
  | horizontal-lineto
  | vertical-lineto
  | curveto
  | smooth-curveto
  | quadratic-bezier-curveto
```

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```

    | smooth-quadratic-bezier-curve
    | elliptical-arc
5
moveto:
    ( "M" | "m" ) wsp* moveto-argument-sequence

moveto-argument-sequence:
10    coordinate-pair
    | coordinate-pair comma-wsp? lineto-argument-sequence

closepath:
    ( "Z" | "z" )

15
lineto:
    ( "L" | "l" ) wsp* lineto-argument-sequence

lineto-argument-sequence:
20    coordinate-pair
    | coordinate-pair comma-wsp? lineto-argument-sequence

horizontal-lineto:
25    ( "H" | "h" ) wsp* horizontal-lineto-argument-sequence

horizontal-lineto-argument-sequence:
    coordinate
    | coordinate comma-wsp? horizontal-lineto-argument-
30    sequence

vertical-lineto:
    ( "V" | "v" ) wsp* vertical-lineto-argument-sequence

vertical-lineto-argument-sequence:
35    coordinate
    | coordinate comma-wsp? vertical-lineto-argument-sequence

curveto:
40    ( "C" | "c" ) wsp* curveto-argument-sequence

curveto-argument-sequence:
    curveto-argument
    | curveto-argument comma-wsp? curveto-argument-sequence
45
curveto-argument:
    coordinate-pair comma-wsp? coordinate-pair comma-wsp?
    coordinate-pair

50
smooth-curveto:
    ( "S" | "s" ) wsp* smooth-curveto-argument-sequence

smooth-curveto-argument-sequence:
55
```

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```
smooth-curveto-argument
| smooth-curveto-argument comma-wsp? smooth-curveto-
5 argument-sequence

smooth-curveto-argument:
    coordinate-pair comma-wsp? coordinate-pair

10 quadratic-bezier-curveto:
    ( "Q" | "q" ) wsp* quadratic-bezier-curveto-argument-
sequence

quadratic-bezier-curveto-argument-sequence:
15 quadratic-bezier-curveto-argument
    | quadratic-bezier-curveto-argument comma-wsp?
    quadratic-bezier-curveto-argument-sequence

quadratic-bezier-curveto-argument:
20 coordinate-pair comma-wsp? coordinate-pair

smooth-quadratic-bezier-curveto:
    ( "T" | "t" ) wsp* smooth-quadratic-bezier-curveto-
25 argument-sequence

smooth-quadratic-bezier-curveto-argument-sequence:
    coordinate-pair
    | coordinate-pair comma-wsp? smooth-quadratic-bezier-
30 curveto-argument-sequence

elliptical-arc:
    ( "A" | "a" ) wsp* elliptical-arc-argument-sequence

35 elliptical-arc-argument-sequence:
    elliptical-arc-argument
    | elliptical-arc-argument comma-wsp? elliptical-arc-
argument-sequence

40 elliptical-arc-argument:
    nonnegative-number comma-wsp? nonnegative-number comma-
wsp?
    number comma-wsp flag comma-wsp flag comma-wsp
45 coordinate-pair

coordinate-pair:
    coordinate comma-wsp? coordinate

50 coordinate:
    number

nonnegative-number:
    integer-constant

55
```

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```

    | floating-point-constant
number:
5   sign? integer-constant
    | sign? floating-point-constant
flag:
10  "0" | "1"
comma-wsp:
    (wsp+ comma? wsp*) | (comma wsp*)
15  comma:
    ",",
integer-constant:
    digit-sequence
20  floating-point-constant:
    fractional-constant exponent?
    | digit-sequence exponent
25  fractional-constant:
    digit-sequence? "." digit-sequence
    | digit-sequence "."
30  exponent:
    ( "e" | "E" ) sign? digit-sequence
sign:
    "+" | "-"
35  digit-sequence:
    digit
    | digit digit-sequence
40  digit:
    "0" | "1" | "2" | "3" | "4" | "5" | "6" | "7" | "8" | "9"
wsp:
45  (#x20 | #x9 | #xD | #xA)

```

[0163] The image element (FIG. 25) indicates that the contents of a complete file are to be rendered into a given rectangle within the current user coordinate system. The image (indicated by the image tag) can refer to raster image files such as PNG or JPEG, or to files with MIME type of "image/wvg", as set forth in the following example:

```

<Image Top="200" Left="200" Width="100px" Height="100px"
55 Source ="myimage.png">
</Image>

```

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[0164] The following table provides information on some example properties for images:

Name	Type	R/RW	Default Value	Description
Top	BoxUnit			Coordinate for the top side of the Image
Left	BoxUnit			Coordinate for the left side of the Image
Width	BoxUnit			Width of the Image
Height	BoxUnit			Height of the Image
Source	ImageData			Source of the Image
Dpi	Float		96(?)	Target DPI to use for sizing
HorizontalAlign	enum { Left (?), Center (?), Right(?) }		Center	
VerticalAlign	enum { Top (?), Middle (?), Bottom(?) }		Middle	
Stretch	enum Stretch { None, Fill, Uniform, UniformToFill }		None	<b>None:</b> Preserve original size  <b>Fill:</b> Aspect ratio is not preserved and the content is scaled to fill the bounds established by tlbh  <b>Uniform</b> Scale size uniformly until the image fits the bounds established by the

				tlwh.  <b>UniformToFill:</b> Scale size uniformly to fill the bounds established by tlbh, and clipped.
ReadyState	enum { MetaDataReady, Loading, Loaded LoadError }			
LoadCounter	Int	Read	Null	Counter that increments when ReadyState is Loading
Name	String			Alternate text for the Image.

[0165] As described above, shapes correspond to geometry drawn with inherited and cascaded presentation properties. The following tables set forth example shape properties for the basic shape elements described above (Rectangle, Ellipse, Line, Polyline, Polygon). Note that these basic shapes may have stroke properties, fill properties, and used as clip paths, have inheritance characteristics, and apply to both the element and Resource levels:

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Name	Type	R/RW	Default Value	Description
Fill	Brush	RW	null	Coordinate for the top side of the rect
FillOpacity	Float	RW	1.0	Coordinate for the left side of the rect
Stroke	Brush	RW	null	Width of the rect
StrokeOpacity	Float	RW	1.0	Height of the rect
StrokeWidth	BoxUnit	RW	1px	Width of the stroke. 1px = 1/96 of an inch
FillRule	enum { EvenOdd, NonZero }	RW	EvenOdd	FillRule indicates the algorithm which is to be used to determine what parts of the canvas are included inside the shape.
StrokeLineCap	enum { Butt, Round, Square, Diamond }	RW	Butt	StrokeLineCap specifies the shape to be used at the end of open subpaths when they are stroked.
StrokeLineJoin	enum { Miter, Round, Bevel }	RW	Miter	StrokeLineJoin specifies the shape to be used at the corners of paths (or other vector shapes) that are stroked when they are stroked.
StrokeMiterLimit	Float	RW	4.0	The limit on the ratio of the MiterLength to the StrokeWidth. Value to be $\geq 1$
StrokeDashArray	PointList	RW	null	StrokeDashArray controls the pattern of dashes and gaps used to stroke paths. <dasharray> contains a list of space- or comma-separated <number>s that specify the lengths of alternating dashes and gaps in user units. If an odd number of values is provided, then the list of values is repeated to yield an even number of values. Thus, stroke-dasharray: 5 3 2 is equivalent to stroke-dasharray: 5 3 2 5 3 2.
StrokeDashOffset	Point	RW		StrokeDashoffset specifies the distance into the dash pattern to start the dash.
Transform	Transform	RW	null	Transform establishes a new coordinate frame for the children of the element

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(continued)

Name	Type	R/RW	Default Value	Description
Clip	Geometry	RW	null	Clip restricts the region to which paint can be applied on the canvas. The default clipping path is defined as the bounding box.

[0166] The following is an example markup syntax for a rectangle:

```
<Rectangle Top="600" Left="100" Width="100" Height="50"
Fill="red" Stroke="blue" StrokeWidth="10"/>
```

[0167] A rectangle has the following properties in the object model (note that rectangles are read/write, have default values equal to zero, support inheritance and apply to both the element and Resource levels):

Name	Type	Description
Top	BoxUnit	Coordinate for the top side of the rect
Left	BoxUnit	Coordinate for the left side of the rect
Width	BoxUnit	Width of the rect
Height	BoxUnit	Height of the rect
RadiusX	BoxUnit	For rounded rectangles, the X-axis radius of the ellipse used to round off the corners of the rectangle. If a negative X-axis radius is specified, the absolute value of the radius will be used.
RadiusY	BoxUnit	For rounded rectangles, the Y-axis radius of the ellipse used to round off the corners of the rectangle. If a negative X-axis radius is specified, the absolute value of the radius will be used.

[0168] The following is an example markup syntax for a circle:

```
<Circle CenterX="600" CenterY="100" Fill="red"
Stroke="blue" StrokeWidth="10"/>
```

A circle has the following properties in the object model (note that circles are read/write, have default values equal to zero, support inheritance and apply to both the element and Resource levels):

Name	Type	Description
CenterX	BoxUnit	X coordinate of the center of the circle
CenterY	BoxUnit	X coordinate of the center of the circle
Radius	BoxUnit	Radius of the circle

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**[0169]** The following is an example markup syntax for an ellipse:

```
<Ellipse CenterX="600" CenterY="100" Fill="red"
Stroke="blue" StrokeWidth="10"/>
```

An ellipse has the following properties in the object model (note that ellipses are read/write, have default values equal to zero, support inheritance and apply to both the element and Resource levels):

Name	Type	Description
CenterX	Coordinate	X coordinate of the center of the ellipse
CenterY	Coordinate	X coordinate of the center of the ellipse
RadiusX	Length	The X-axis radius of the ellipse. If a negative X-axis radius is specified, the absolute value of the radius will be used.
RadiusY	Length	The Y-axis radius of the ellipse. If a negative Y-axis radius is specified, the absolute value of the radius will be used.

**[0170]** The following is an example markup syntax for a line:

```
<Line x1="100" y1="300" x2="300" y2="100"
StrokeWidth="5" />
```

A line has the following properties in the object model (note that lines are read/write, have default values equal to zero, support inheritance and apply to both the element and Resource levels):

Name	Type	Description
X1	BoxUnit	The X-axis coordinate of the start of the line. The default value is "0".
Y1	BoxUnit	The Y-axis coordinate of the start of the line. The default value is "0".
X2	BoxUnit	The X-axis coordinate of the end of the line. The default value is "0".
Y2	BoxUnit	The Y-axis coordinate of the end of the line. The default value is "0".

**[0171]** The 'Polyline' defines a set of connected straight line segments. Typically, a 'Polyline' defines an open shape.

**[0172]** The following is an example markup syntax for a polyline:



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```

<Polyline Fill="None" Stroke="Blue" StrokeWidth="10cm"
Points="50,375
150,375 150,325 250,325 250,375
350,375 350,250 450,250 450,375
550,375 550,175 650,175 650,375
750,375 750,100 850,100 850,375
950,375 950,25 1050,25 1050,375
1150,375" />

```

A polyline has the following properties in the object model (note that lines are read/write, have default values equal to null, support inheritance and apply to both the element and Resource levels):

Name	Type	Description
Points	PointCollection	The points that make up the Polyline. Coordinate values are in the user coordinate system.

**[0173]** The Polygon element defines a closed shape comprising a set of connected straight line segments. The following is an example markup syntax for a polygon:

```

<Polygon Fill="red" Stroke="blue" StrokeWidth="10"
points="350,75 379,161 469,161 397,215
423,301 350,250 277,301 303,215
231,161 321,161" />

```

A polygon has the following properties in the object model (note that lines are read/write, have default values equal to null, support inheritance and apply to both the element and Resource levels):

Name	Type	Description
Points	PointCollection	The points that make up the Polygon. Coordinate values are in the user coordinate system. If an odd number of coordinates are provided, then the element is in error.

**[0174]** The grammar for points specifications in 'polyline' and 'polygon' elements is described with the following notation:

```

*: 0 or more
+: 1 or more
?: 0 or 1
(): grouping
|: separates alternatives
double quotes surround literals

```

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**[0175]** The following describes the points specifications in 'Polyline' and 'Polygon' elements using the above notation:

```

list-of-points:
    wsp* coordinate-pairs? wsp*

coordinate-pairs:
    coordinate-pair
    | coordinate-pair comma-wsp coordinate-pairs

coordinate-pair:
    coordinate comma-wsp coordinate

coordinate:
    number

number:
    sign? integer-constant
    | sign? floating-point-constant

comma-wsp:
    (wsp+ comma? wsp*) | (comma wsp*)

comma:
    ",", "

integer-constant:
    digit-sequence

floating-point-constant:
    fractional-constant exponent?
    | digit-sequence exponent

fractional-constant:
    digit-sequence? "." digit-sequence

```

```

    | digit-sequence "."

exponent:
    ( "e" | "E" ) sign? digit-sequence

sign:
    "+" | "-"

digit-sequence:
    digit
    | digit digit-sequence

digit:
    "0" | "1" | "2" | "3" | "4" | "5" | "6" | "7" | "8" | "9"

wsp:
    (#x20 | #x9 | #xD | #xA)+

```

**CONCLUSION**

**[0176]** As can be seen from the foregoing detailed description, there is provided a system, method and element / object model that provide program code various mechanisms to interface with a scene graph. The system, method

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and object model are straightforward to use, yet powerful, flexible and extensible.

[0177] While the invention is susceptible to various modifications and alternative constructions, certain illustrated embodiments thereof are shown in the drawings and have been described above in detail. It should be understood, however, that there is no intention to limit the invention to the specific forms disclosed, but on the contrary, the intention is to cover all modifications, alternative constructions, and equivalents falling within the spirit and scope of the invention.

**Claims**

1. In a computing environment, a system comprising:

a mechanism that interprets markup to construct an element tree of elements, at least some of the elements in the element tree having associated property data and corresponding to an element object model;  
a scene graph interface layer, comprising a set of at least one interface that populates a scene graph with objects in response to requests to create the objects, the objects corresponding to a scene graph object model;  
and  
a translator that translates at least some of the elements and property data in the element tree into requests to the scene graph interface layer to create objects in the scene graph.

2. The system of claim 1 wherein the elements of the element object model substantially correlate with the objects of the scene graph object model.

3. The system of claim 1 wherein the markup includes inline text including a string that defines an element property, and the translator communicates with a type converter to convert the string to an object property.

4. The system of claim 1 wherein the markup includes inline text comprising complex property syntax.

5. The system of claim 4 wherein the inline text is identified with a reference that is referred to at another location in the markup.

6. The system of claim 4 wherein the inline text is identified with a reference that refers to a file.

7. The system of claim 4 wherein the inline text is identified with a reference that corresponds to a file that may be downloaded from a remote location in a network.

8. The system of claim 1 wherein the markup includes inline text comprising complex property syntax corresponding to a graphical resource.

9. The system of claim 8 wherein the graphical resource describes a visual brush object, the translator providing resource level data for directly communicating with the scene graph interface layer to create a visual paint object corresponding to the element described by the complex property syntax.

10. The system of claim 9 wherein the resource level data is identified with a reference that is referred to at another location in the markup.

11. The system of claim 9 wherein the resource level data is identified with a reference that refers to a file.

12. The system of claim 9 wherein the resource level data is identified with a reference that refers to a file that may be downloaded from a remote location in a network.

13. The system of claim 1 wherein one of the elements of the element object model comprises an image element.

14. The system of claim 1 wherein one of the elements of the element object model comprises a video element.

15. The system of claim 1 wherein one of the elements of the element object model comprises a canvas element that contains a shape element.

16. The system of claim 1 wherein one of the elements of the element object model comprises a shape element.

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17. The system of claim 16 wherein the shape element comprises a rectangle element.

18. The system of claim 16 wherein the shape element comprises a polyline element.

5 19. The system of claim 16 wherein the shape element comprises a polygon element.

20. The system of claim 16 wherein the shape element comprises a path element.

21. The system of claim 16 wherein the shape element comprises a line element.

10 22. The system of claim 16 wherein the shape element comprises an ellipse element.

23. The system of claim 16 wherein the shape element comprises a circle element.

15 24. The system of claim 16 wherein the shape element includes fill property data.

25. The system of claim 16 wherein the shape element includes stroke property data.

20 26. The system of claim 16 wherein the shape element includes clipping property data.

27. The system of claim 16 wherein the shape element includes transform property data.

28. The system of claim 16 wherein the shape element includes effect data.

25 29. The system of claim 16 wherein the shape element includes opacity data.

30. The system of claim 16 wherein the shape element includes blend mode data.

30 31. The system of claim 1 further comprising an engine that processes the scene graph data structure and provides commands to at least one lower level graphics component.

32. The system of claim 31 wherein the engine traverses the scene graph data structure.

35 33. The system of claim 31 wherein the engine transmits the scene graph data structure.

34. The system of claim 1 wherein the translator requests instantiation of at least one builder to create the objects.

35. A computer-implemented method, comprising:

40 parsing markup, the markup including tags and associated property data according to an object model;  
interpreting a tag in the markup to determine whether the tag is directed to an element level or to a resource level;  
and

45 a) if the tag is directed to the element level, creating an element based on the tag and property data associated with the tag and adding the element to an element tree for later translation into a scene graph object in a scene graph data structure; and  
b) if the tag is directed to the resource level, providing data to directly create a scene graph object in the scene graph data structure via an interface to the scene graph data structure.

50 36. The method of claim 35 wherein objects of the element object model substantially correlate with objects in the scene graph data structure.

55 37. The method of claim 35 wherein the markup includes inline text for a tag property value and further comprising, communicating with a type converter to convert the inline text to an object property.

38. The method of claim 35 wherein the markup includes inline text for a tag property value having a reference to other text in the markup, and wherein interpreting the tag property value comprises interpreting the other text.

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39. The method of claim 35 wherein the markup includes tags comprising complex property syntax for an element, and wherein interpreting the tags comprises interpreting the complex property syntax to determine that the tags are directed to the element level.

5 40. The method of claim 35 wherein the markup includes tags specifying complex property syntax for an element, and wherein interpreting the tags comprises interpreting the complex property syntax to determine that the element is directed to the resource level.

10 41. The method of claim 40 wherein interpreting the complex property syntax comprises detecting that the complex property syntax describes a property corresponding to a visual brush object.

42. The method of claim 40 wherein tags defining a visual brush object are referenced by an element in the element tree.

15 43. A computer-readable medium having computer-executable instructions for performing the method of claim 35.

44. A computer-readable medium having stored thereon a data structure, comprising:

20 a first set of data comprising a first set of tags and property data, in which the context in which the first set of tags is interpreted indicates that the first set of tags is directed to an element level;

a second set of data comprising a second set of tags and second property data, in which the context in which the second set of tags is interpreted corresponds to complex property syntax and indicates that the second set of tags is directed to a resource level; and

25 when the data structure is interpreted, the first set of data results in data corresponding to the first set of tags being created and inserted into an element-level tree based on the first information in the first set of text, and the second set of data results in data corresponding to the second set of tags being provided to directly create a scene graph object in a scene graph data structure at the resource level via an interface to the scene graph data structure, based on the second information in the second set of text.

30 45. The data structure of claim 44 further comprising a third set of data comprising a string corresponding to a property value.

46. The data structure of claim 44 wherein the first set of tags specify an identifier, and further comprising a third set of data that references the identifier.

35 47. The data structure of claim 46 wherein when interpreted, the third set of data results in data corresponding to the first set of tags being added to the element-level tree in a tree location for the third set of data.

40 48. The data structure of claim 44 wherein the second set of tags includes an identifier, and further comprising a third set of data that references the identifier.

49. The data structure of claim 44 wherein the second set of tags includes data formatted in a complex property syntax inline in markup.

45 50. The data structure of claim 49 wherein the complex property syntax describes a resource level element having a fill property corresponding to a visual paint object.

51. The data structure of claim 49 wherein the complex property syntax describes properties of an image element.

50 52. The data structure of claim 49 wherein the complex property syntax describes properties of a video element.

53. The data structure of claim 44 wherein the first set of tags describes properties of a shape element.

55 54. The data structure of claim 53 further comprising data in the data structure that describes a canvas element that contains the shape element.

55. The data structure of claim 53 wherein the properties of the shape element comprise fill property data.

56. The data structure of claim 53 wherein the properties of the shape element comprise stroke property data.

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**57.** The data structure of claim 44 wherein the properties of the first element include clipping data.

**58.** The data structure of claim 44 wherein the properties of the first element include transform data

5 **59.** The data structure of claim 44 wherein the properties of the first element include opacity data.

**60.** The data structure of claim 44 wherein the properties of the first element include blend mode data.

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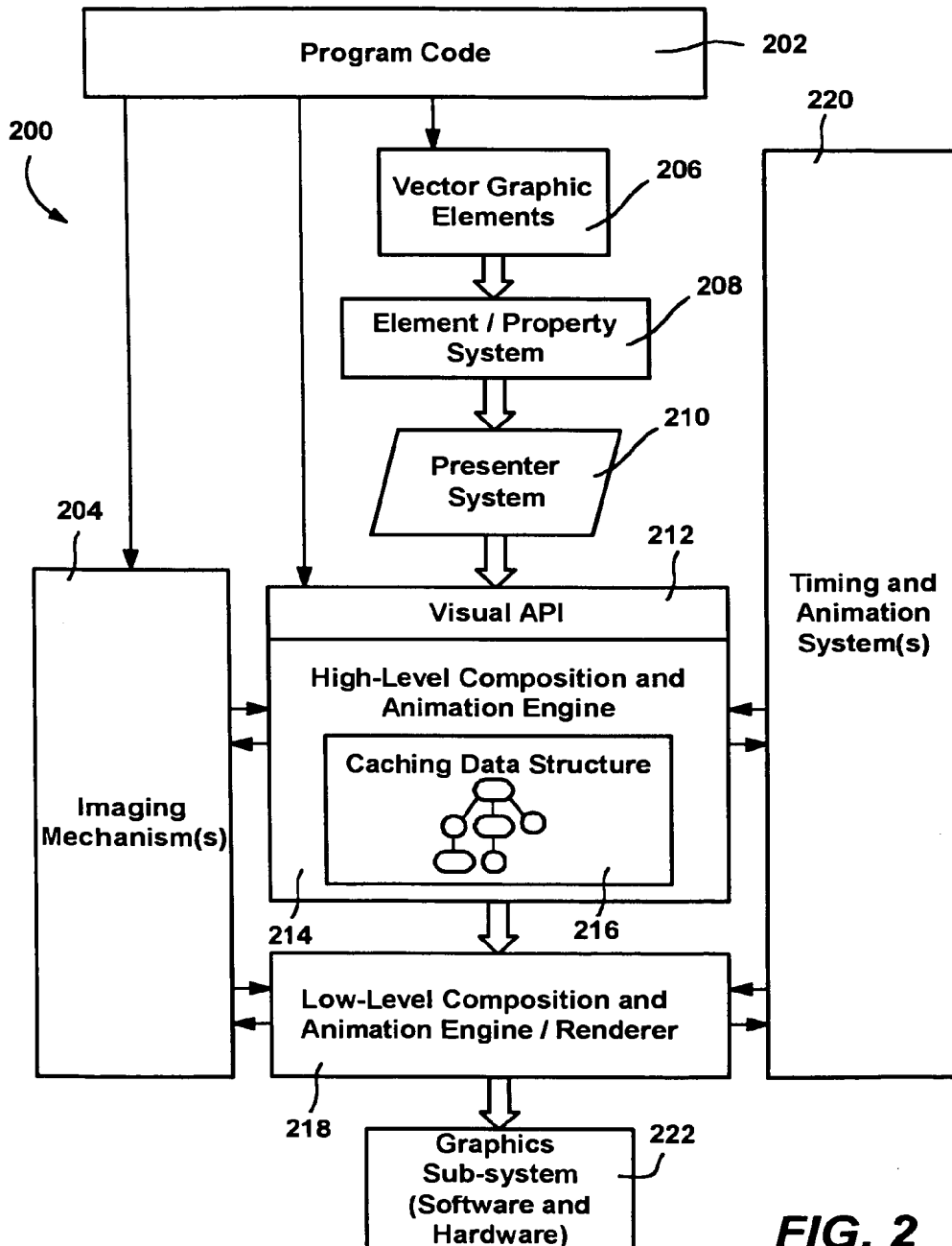
45

50

55

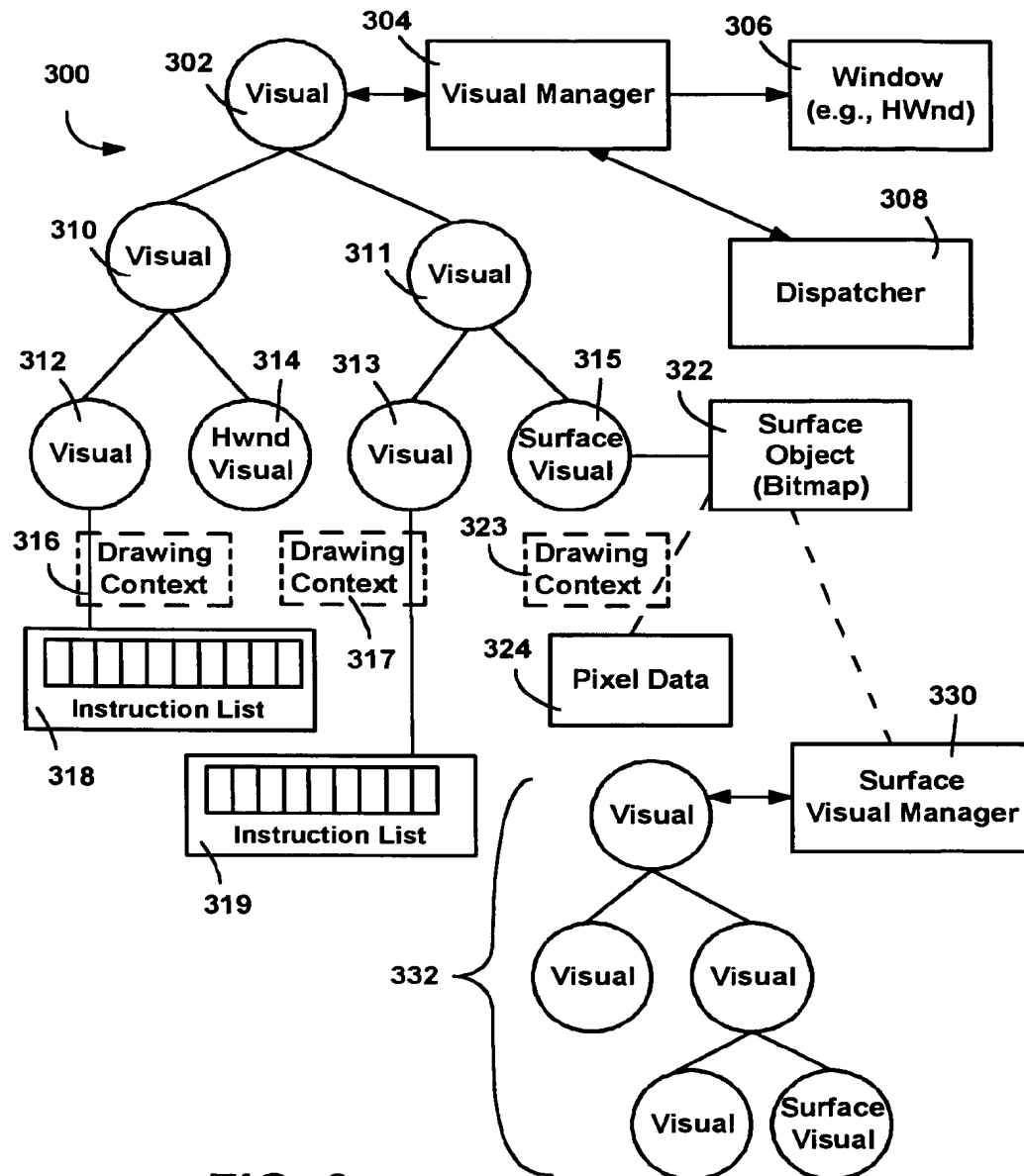


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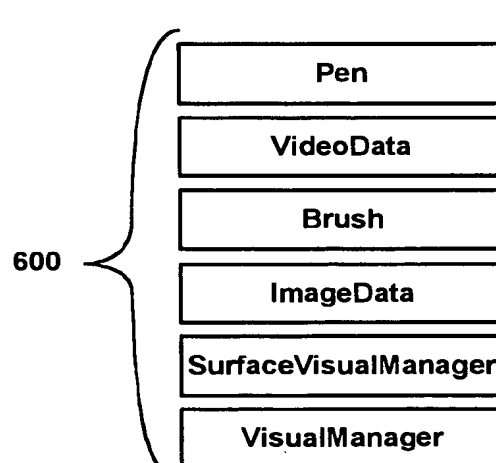
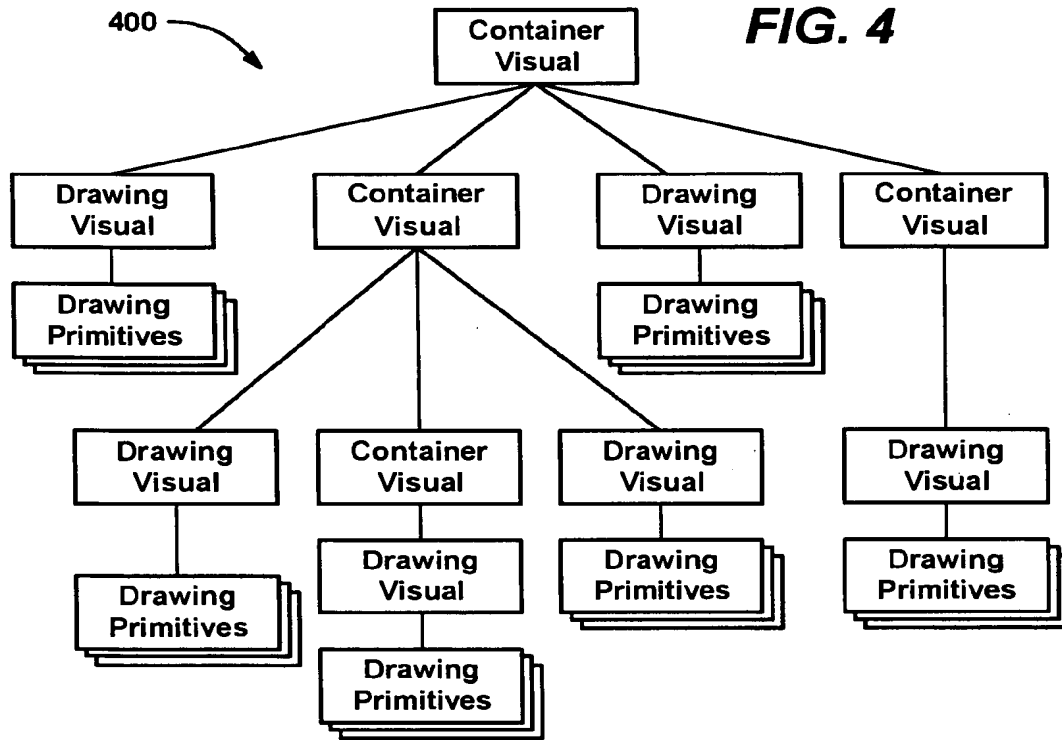




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**FIG. 3**

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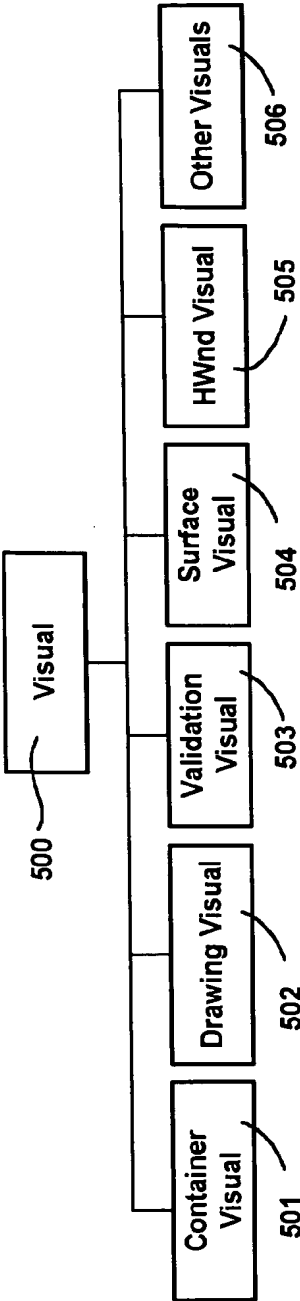


FIG. 5

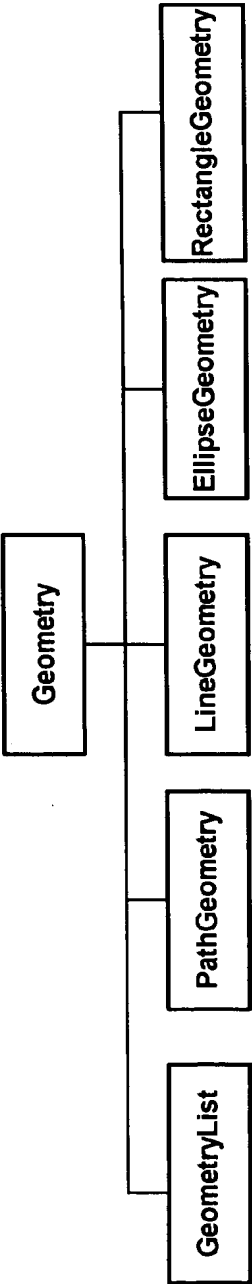
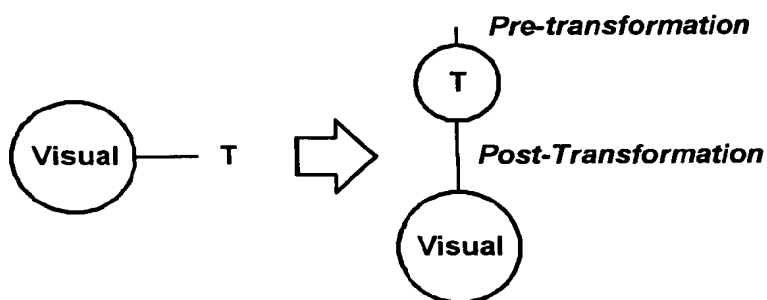
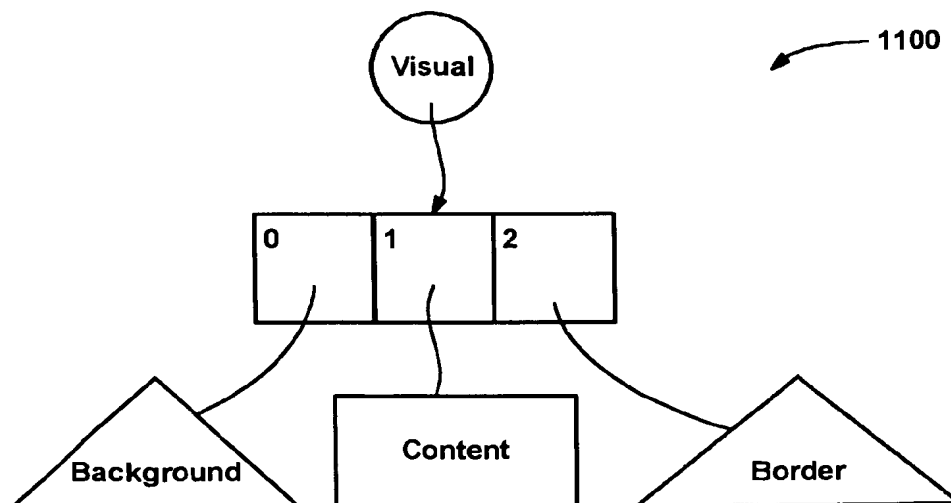


FIG. 12

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**FIG. 7****FIG. 11**

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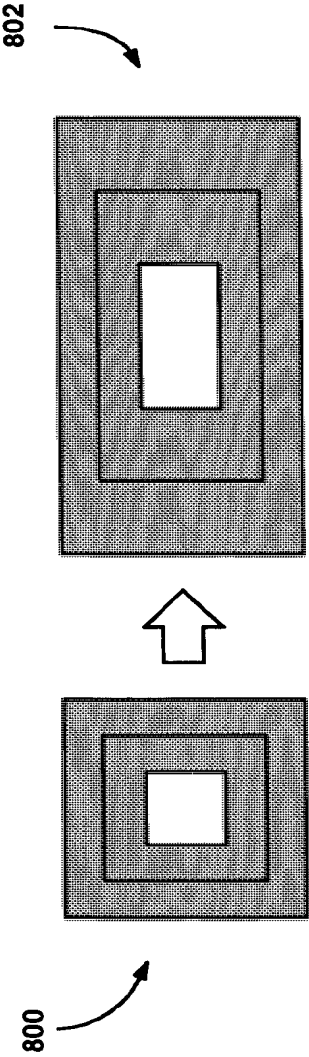


FIG. 8A

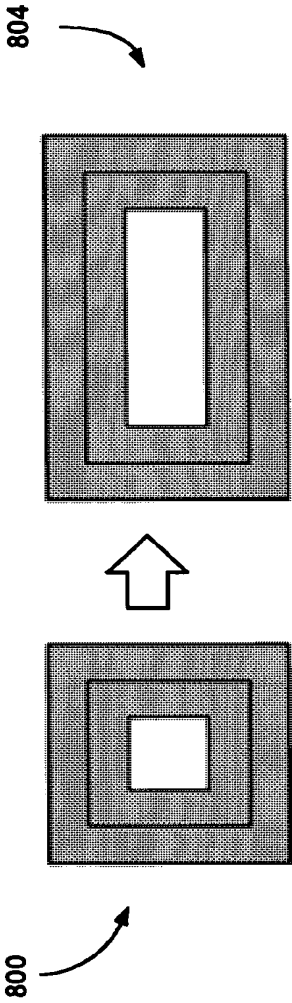
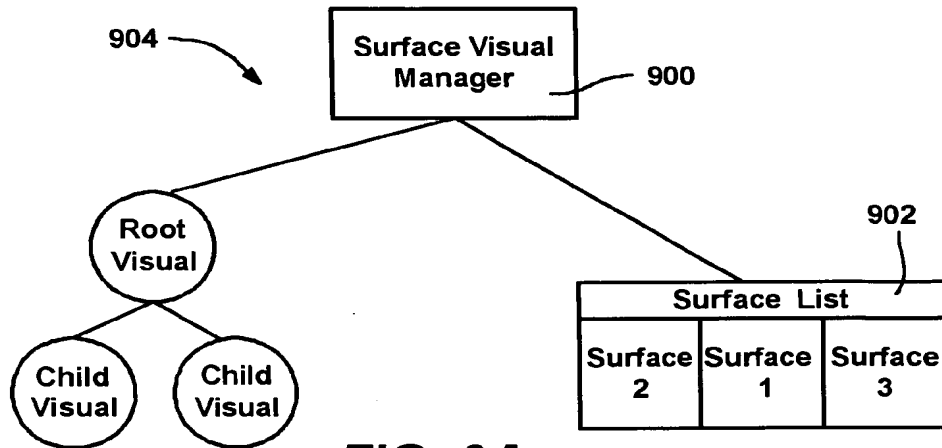
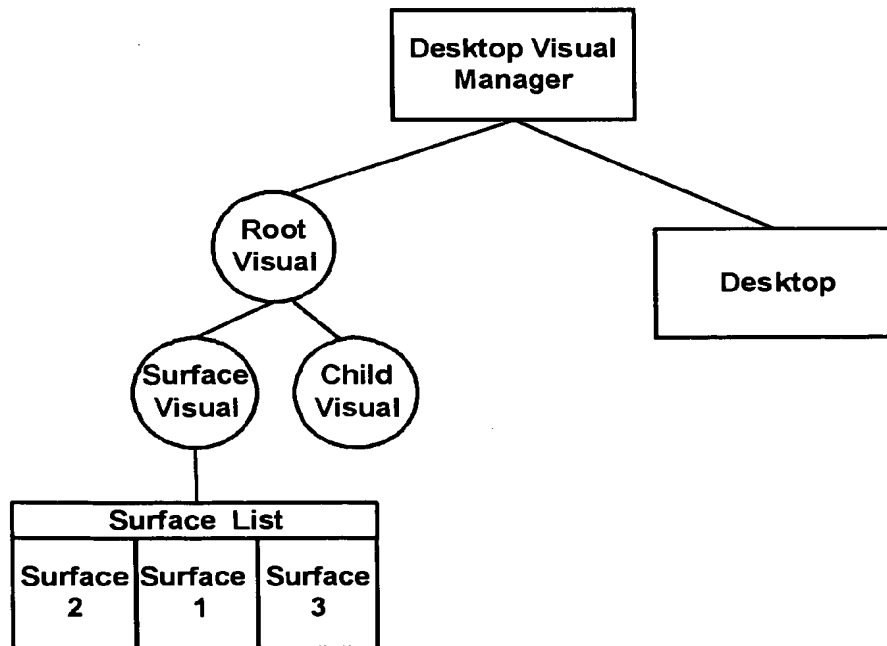


FIG. 8B

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**FIG. 9A****FIG. 9B**

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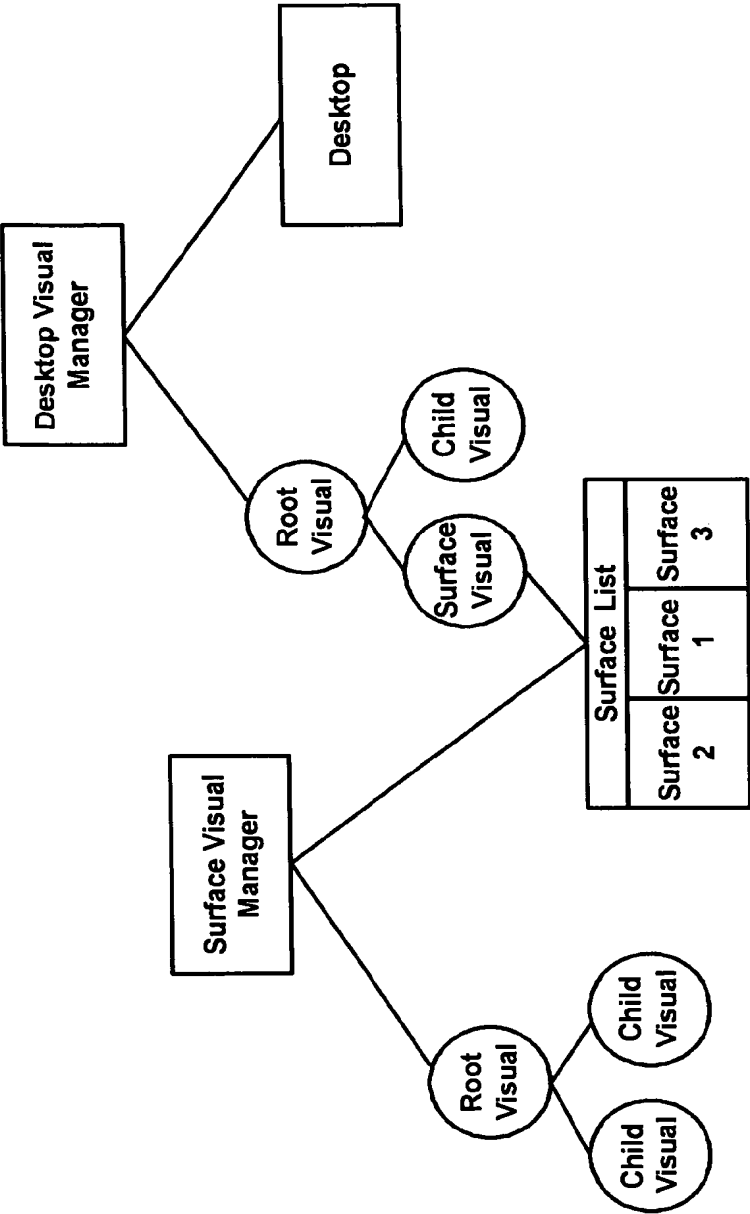
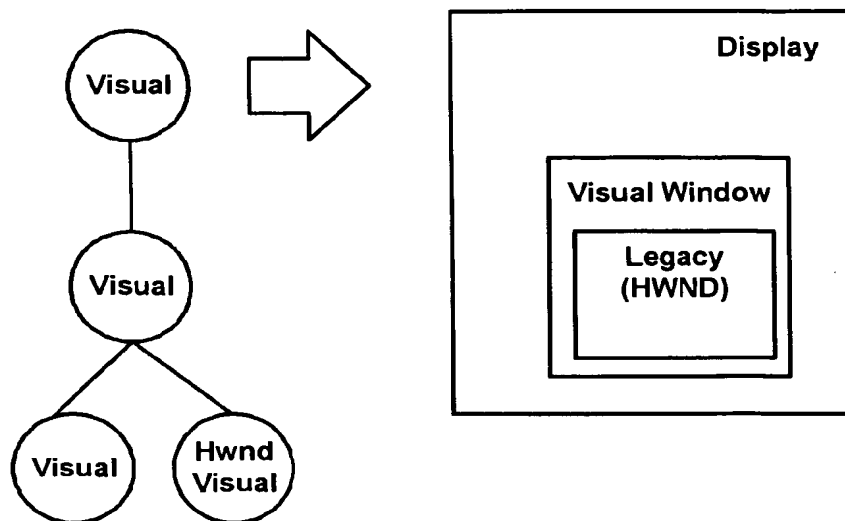
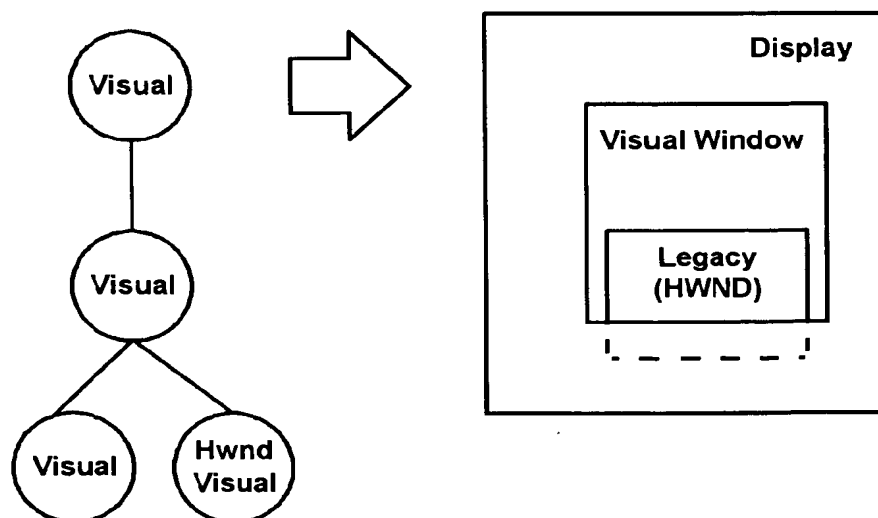


FIG. 9C

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**FIG. 10A****FIG. 10B**



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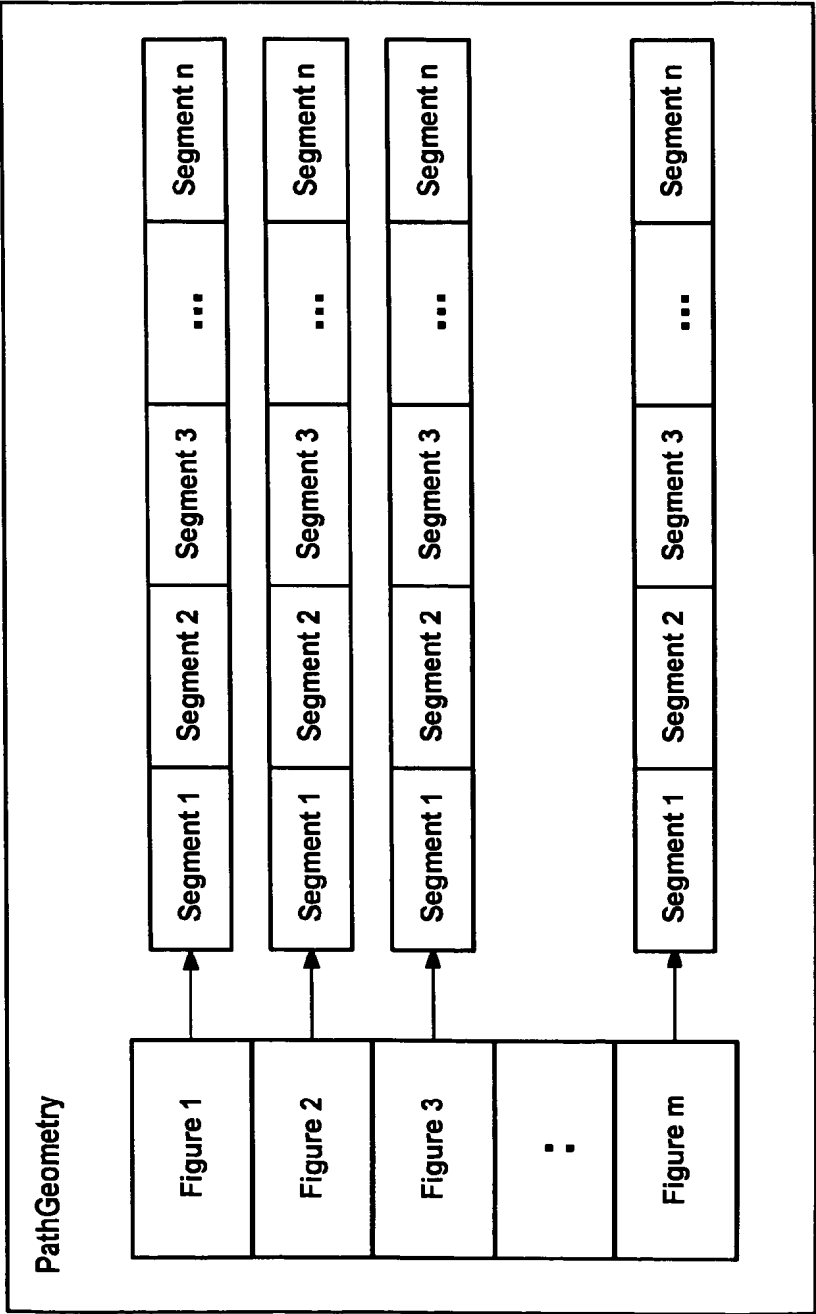
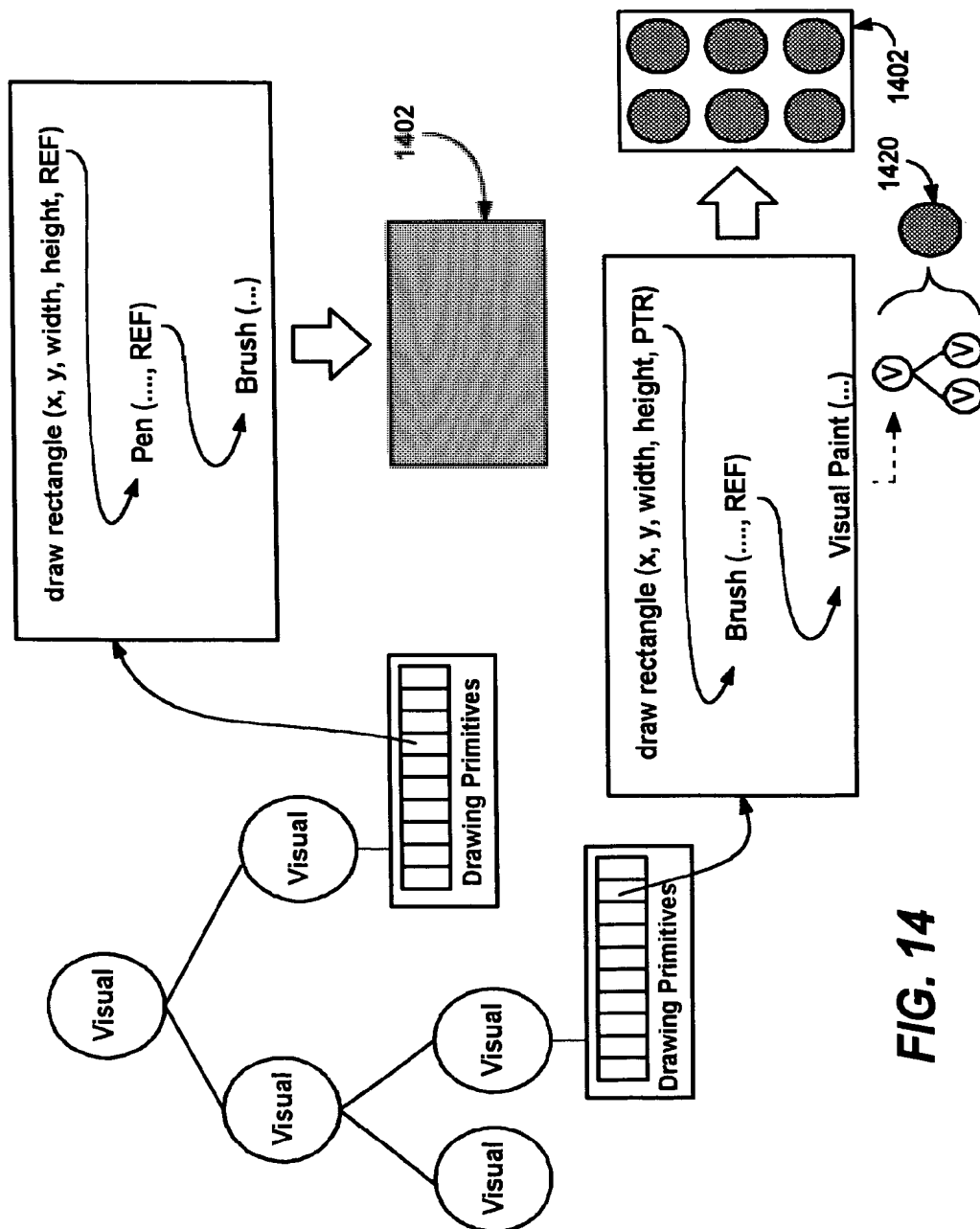


FIG. 13

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**FIG. 14**

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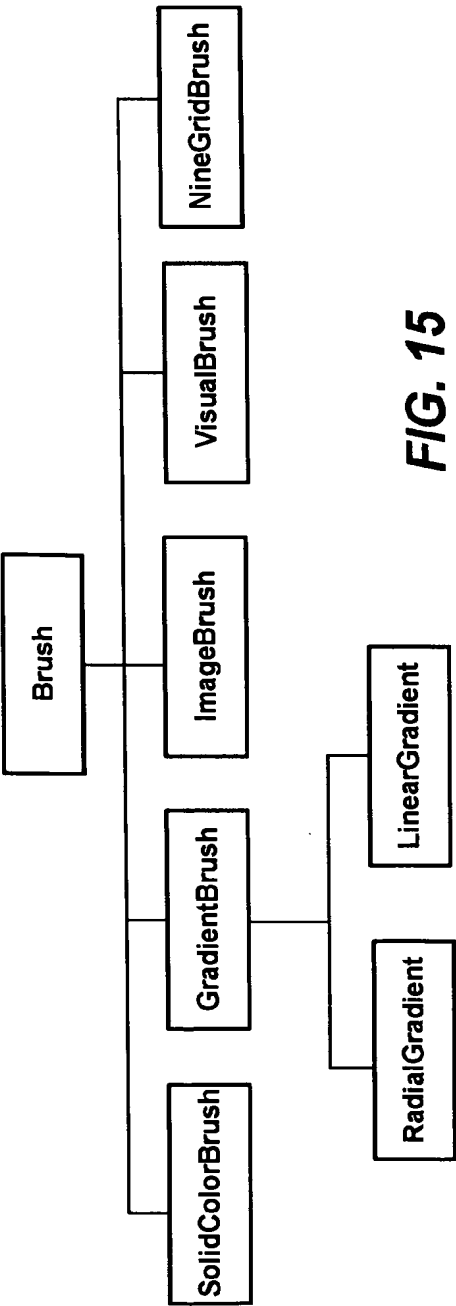


FIG. 15

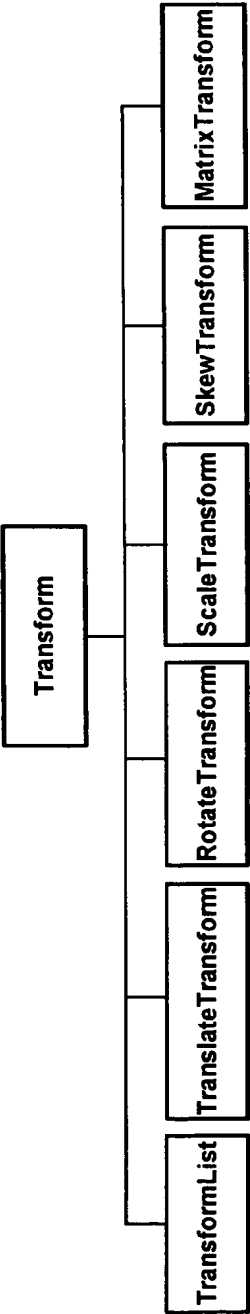
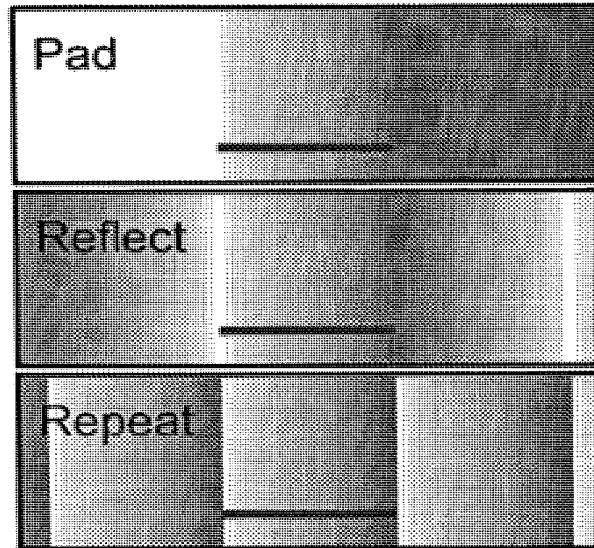
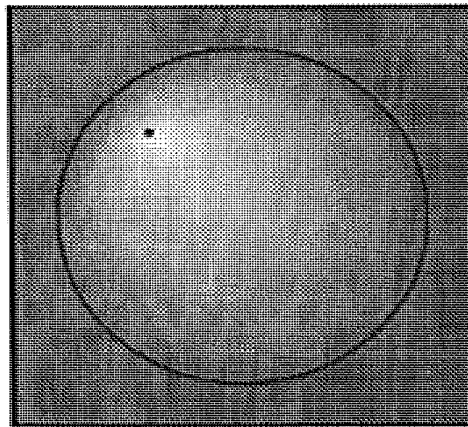


FIG. 24

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**FIG. 16****FIG. 17**

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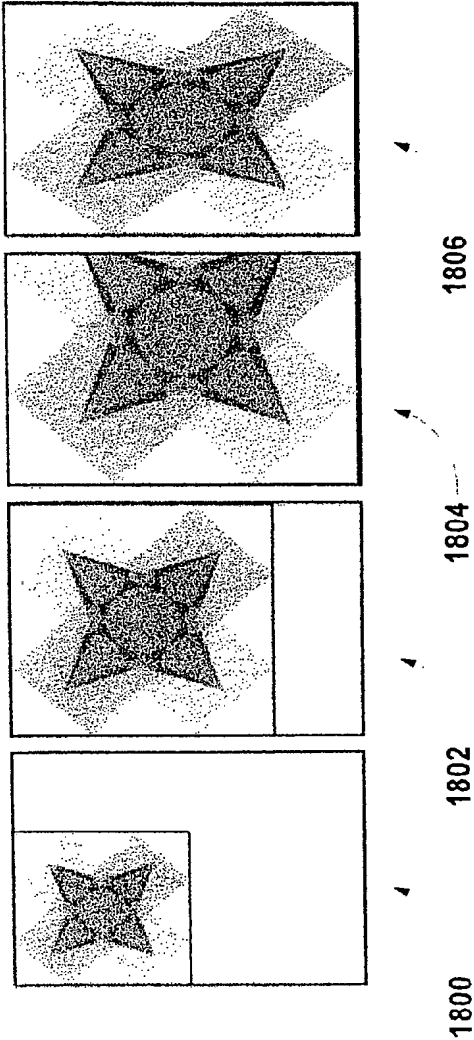
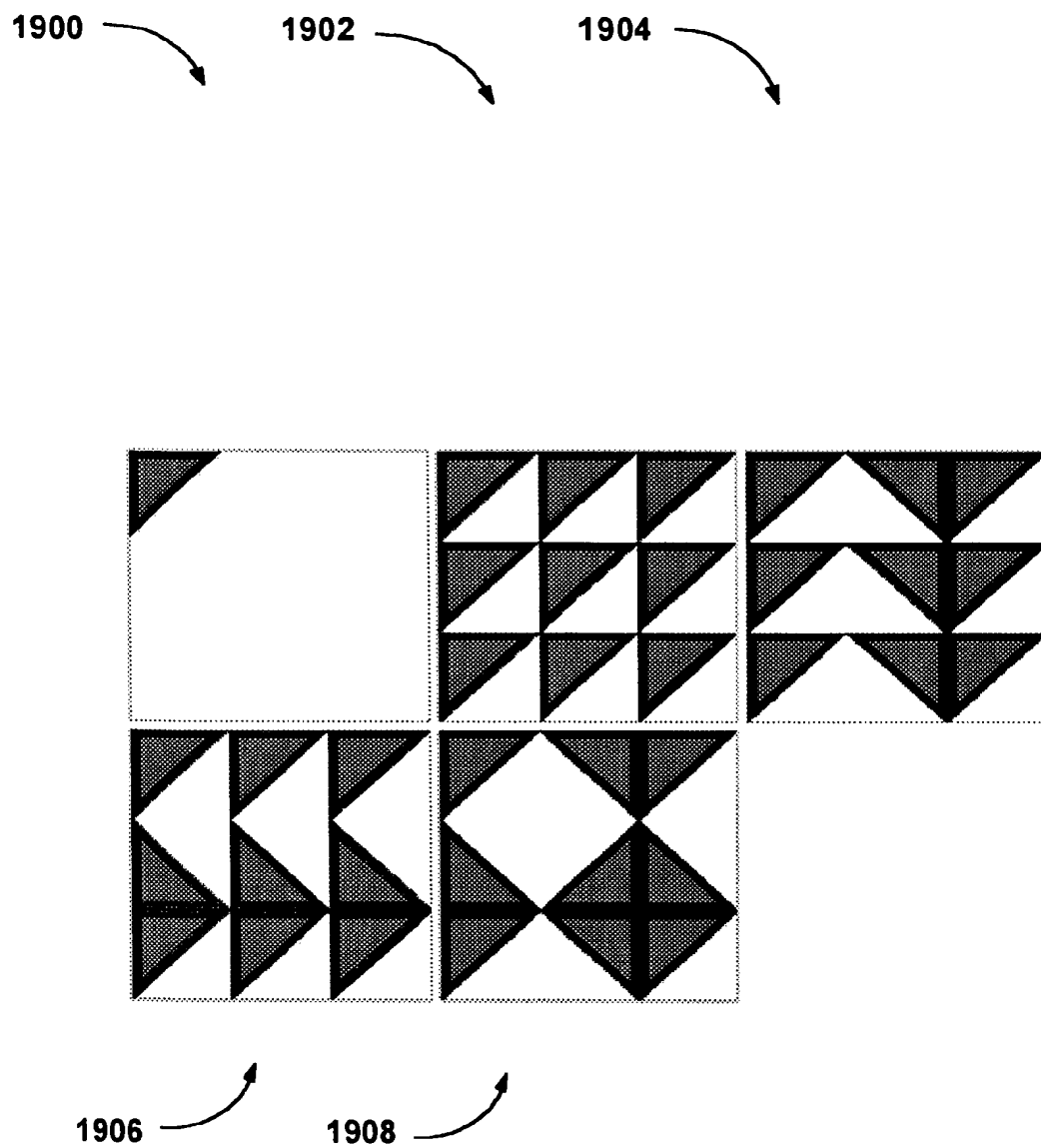
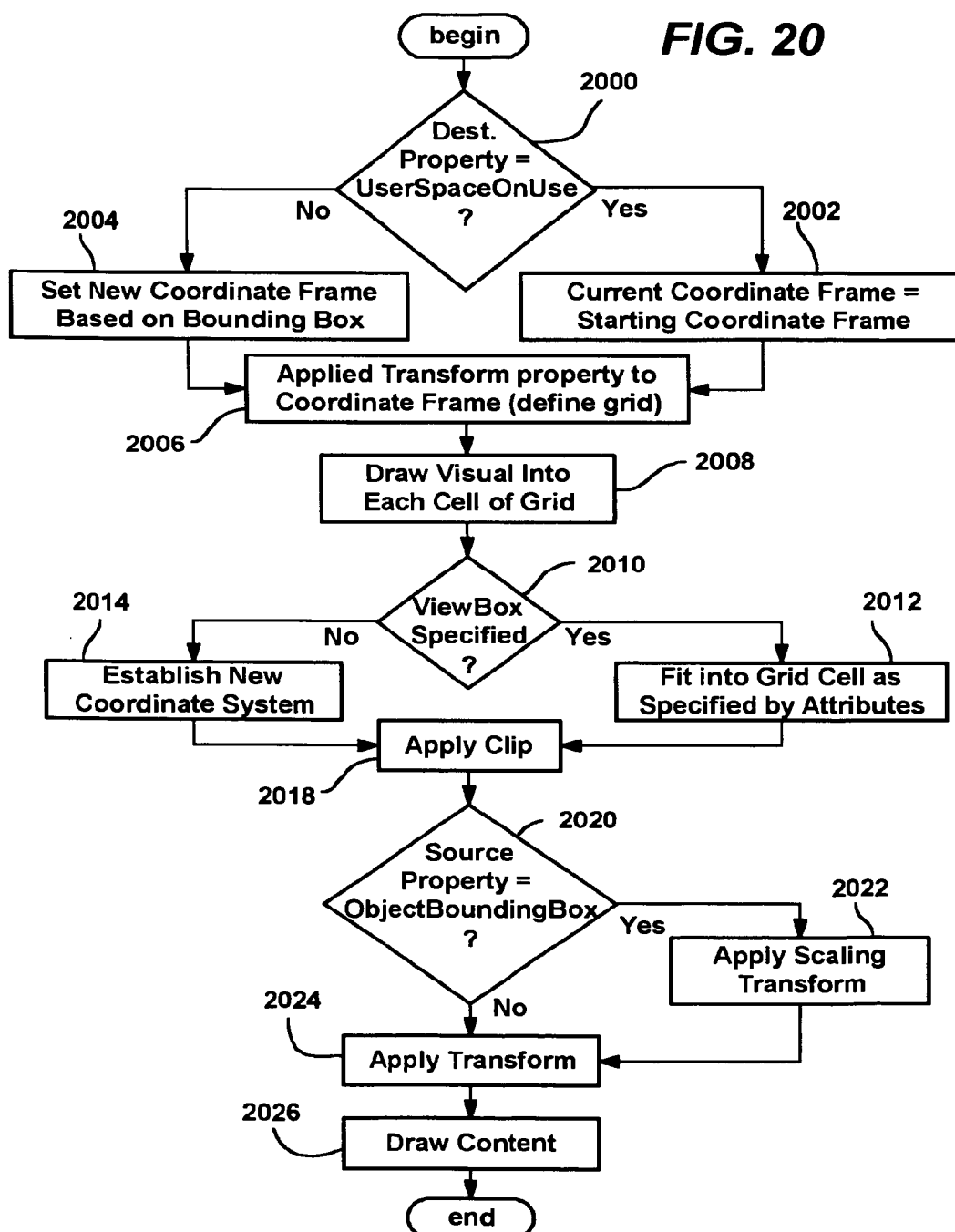


FIG. 18

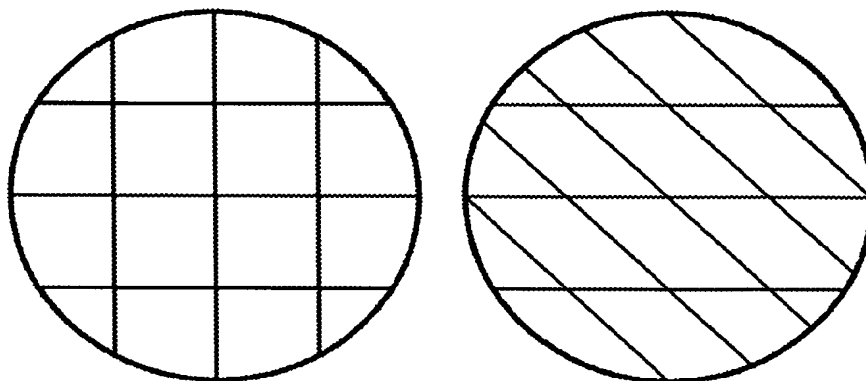
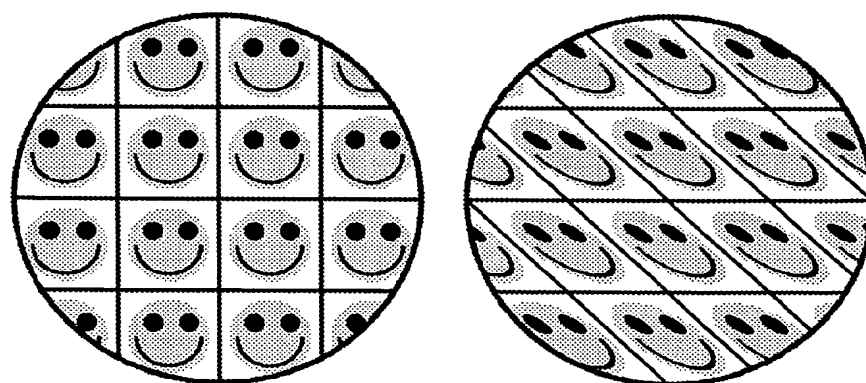
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**FIG. 19**

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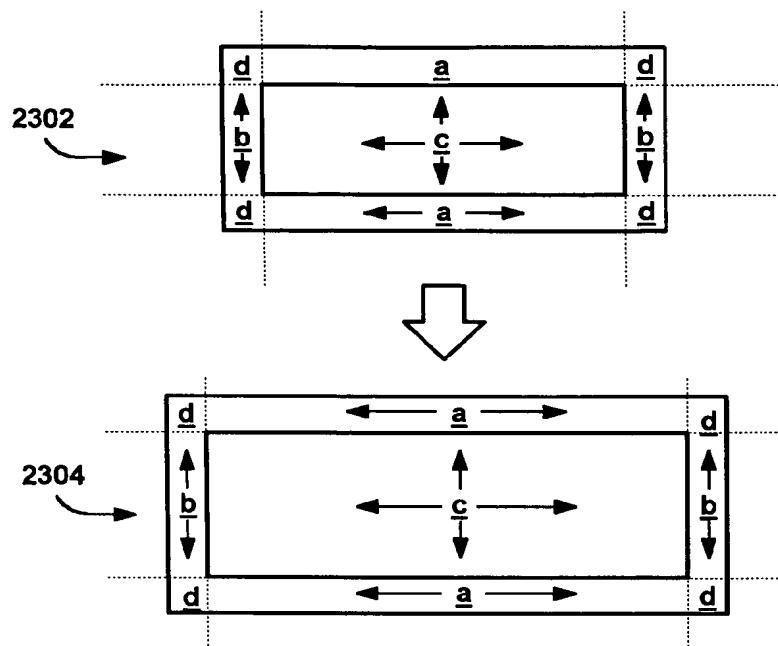
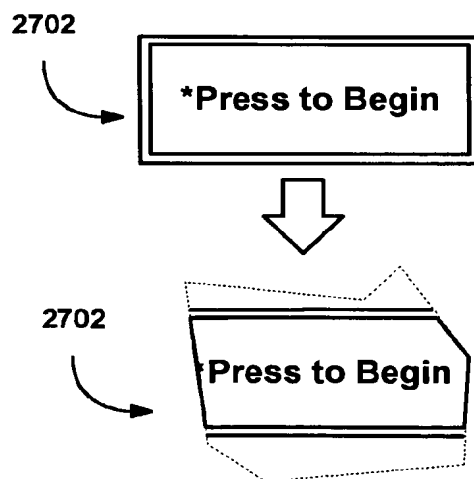


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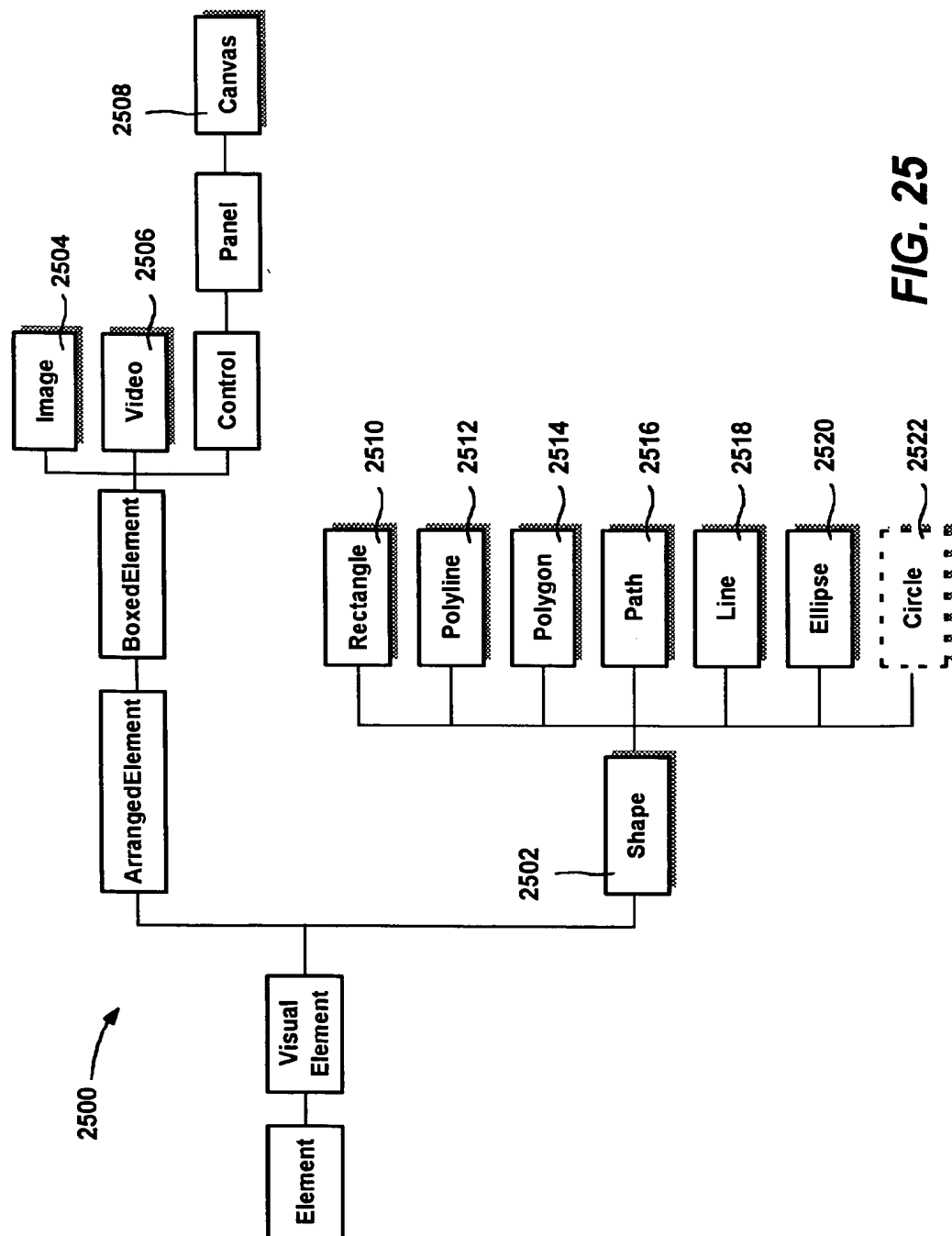
**FIG. 21****FIG. 22**



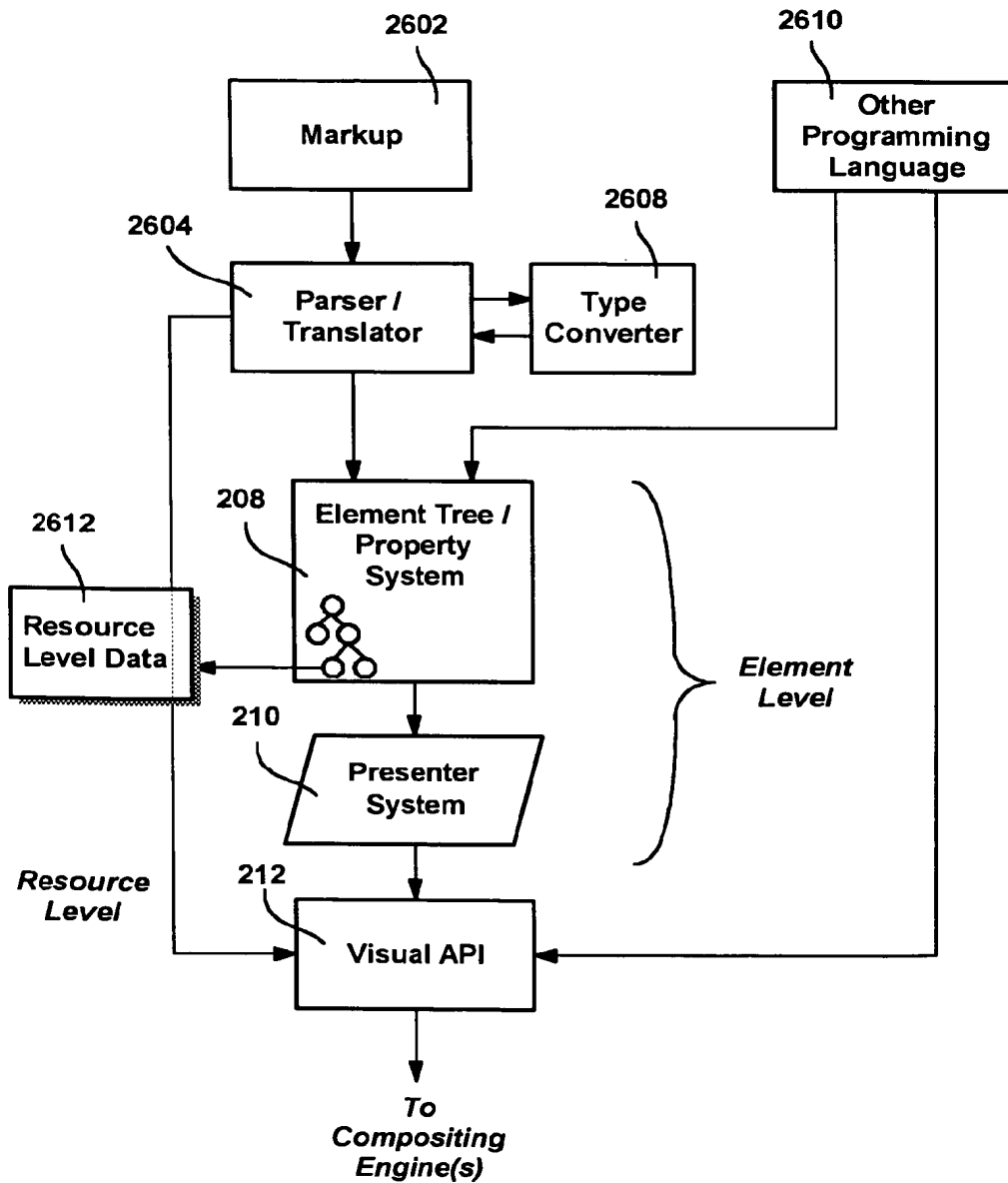
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**FIG. 23****FIG. 27**

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**FIG. 26**

**Electronic Acknowledgement Receipt**

<b>EFS ID:</b>	42385640
<b>Application Number:</b>	16852790
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5321
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas Lee/Shelly Darrenkamp
<b>Filer Authorized By:</b>	Thomas Lee
<b>Attorney Docket Number:</b>	BEEL3004C/TL
<b>Receipt Date:</b>	07-APR-2021
<b>Filing Date:</b>	20-APR-2020
<b>Time Stamp:</b>	09:23:46
<b>Application Type:</b>	Utility under 35 USC 111(a)

**Payment information:**

Submitted with Payment	no
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**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	BEEL3004C_IDS.pdf	1034458 0a3734d89a6be4802cb6a7b7571c2fac57151269	no	4

**Warnings:**

<b>Information:</b>					
2	Foreign Reference	EP462998A2.pdf	3272703	no	78
			27854a80eb58b3698861270b932ed5eaf0e57ba2		
<b>Warnings:</b>					
<b>Information:</b>					
3	Non Patent Literature	ESR_7Apr2021.pdf	472421	no	12
			6364ec0674c847addf72eab2c2b761059460f494		
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<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			4779582		
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Doc code: IDS

PageID #: 3739

PTO/SB/08a (02-18)

Doc description: Information Disclosure Statement (IDS) Filed

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	Filing Date	2020-04-20
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	Christopher A. Bartels
	Attorney Docket Number	BEEL3004C/TL

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		16852790
	Filing Date		2020-04-20
	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name	Christopher A. Bartels	
	Attorney Docket Number	BEEL3004C/TL	

1	European Office Action in corresponding European Application No. 12775162.6, dated April 19, 2021.
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Examiner Signature		Date Considered	
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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	16852790
	Filing Date	2020-04-20
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	Christopher A. Bartels
	Attorney Docket Number	BEEL3004C/TL

### CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

### SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2021-04-21
Name/Print	THOMAS LEE	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**



## Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**Electronic Patent Application Fee Transmittal**

<b>Application Number:</b>	16852790			
<b>Filing Date:</b>	20-Apr-2020			
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS			
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel			
<b>Filer:</b>	Thomas Lee/Shelly Darrenkamp			
<b>Attorney Docket Number:</b>	BEEL3004C/TL			
Filed as Large Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
SUBMISSION- INFORMATION DISCLOSURE STMT	1806	1	260	260
<b>Total in USD (\$)</b>				<b>260</b>

**Electronic Acknowledgement Receipt**

<b>EFS ID:</b>	42507812
<b>Application Number:</b>	16852790
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5321
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas Lee/Shelly Darrenkamp
<b>Filer Authorized By:</b>	Thomas Lee
<b>Attorney Docket Number:</b>	BEEL3004C/TL
<b>Receipt Date:</b>	21-APR-2021
<b>Filing Date:</b>	20-APR-2020
<b>Time Stamp:</b>	13:34:33
<b>Application Type:</b>	Utility under 35 USC 111(a)

**Payment information:**

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$260
RAM confirmation Number	E20214KD34511712
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	EP_OA4_19Apr2021.pdf	638990	no	15
			a90f485694db254ccb175b811deb1022df013cb3		
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	BEEL3004C_IDS.pdf	1034406	no	4
			bbd4d75e0b9dcb81346847309b5f63e8c57ef11f		
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30586	no	2
			ada70a88771e703457a2ee676653d6fe7b106954		
Warnings:					
Information:					
Total Files Size (in bytes):			1703982		

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

Doc code: IDS

PageID #: 3747

PTO/SB/08a (02-18)

Doc description: Information Disclosure Statement (IDS) Filed

Approved for use through 11/30/2020. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	16852790
	Filing Date	2020-04-20
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	Christopher A. Bartels
	Attorney Docket Number	BEEL3004C/TJM

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		16852790
	Filing Date		2020-04-20
	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name	Christopher A. Bartels	
	Attorney Docket Number	BEEL3004C/TJM	

1	Summons To Attend Oral Proceedings in corresponding European Application No. 12762258.7, dated May 20, 2021.
---	--

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#### EXAMINER SIGNATURE

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

**\*EXAMINER:** Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		16852790
	Filing Date		2020-04-20
	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name	Christopher A. Bartels	
	Attorney Docket Number	BEEL3004C/TJM	

### CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

### SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas J. Moore/	Date (YYYY-MM-DD)	2021-05-28
Name/Print	THOMAS J. MOORE	Registration Number	28974

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**



## Privacy Act Statement

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**Electronic Acknowledgement Receipt**

<b>EFS ID:</b>	42834632
<b>Application Number:</b>	16852790
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5321
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas J. Moore/Shelly Darrenkamp
<b>Filer Authorized By:</b>	Thomas J. Moore
<b>Attorney Docket Number:</b>	BEEL3004C/TL
<b>Receipt Date:</b>	28-MAY-2021
<b>Filing Date:</b>	20-APR-2020
<b>Time Stamp:</b>	08:13:37
<b>Application Type:</b>	Utility under 35 USC 111(a)

**Payment information:**

Submitted with Payment	no
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**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	BEEL3004C_IDS.pdf	1034441	no	4
			71ebaf233acc46b8d216eb03c8b3c3a80c49b2a8		

**Warnings:**

**Information:**

A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.

2	Non Patent Literature	Summonsattendoralproceedin gs_20May2021.pdf	3806026	no	72
			a4cbac9591e7978bff2b1b60596e82dd2ad 2d236		

**Warnings:****Information:****Total Files Size (in bytes):**

4840467

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**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

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## TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	16/852,790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman Beel
Title	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
Art Unit	2184
Examiner Name	BARTELS, CHRISTOPHER A.
Attorney Docket Number	21044.0006USC1

### SIGNATURE of Applicant or Patent Practitioner

Signature	/Thomas Lee/	Date (Optional)	2021-06-11
Name	Thomas Lee	Registration Number	66,396
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

**NOTE:** This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.



\*Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: PA..

Document Description: Power of Attorney

PTO/AIA/82B (07-13)

Approved for use through 11/30/2014. OMB 0851-0051

U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

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**POWER OF ATTORNEY BY APPLICANT**

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below:

Application Number

Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)



I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above:

52835

OR



I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:



The address associated with the above-mentioned Customer Number

OR



The address associated with Customer Number:

OR

Firm or  
Individual Name

Address

City

State

Zip

Country

Telephone

Email

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

BARCO N.V.



Inventor or Joint Inventor (title not required below)



Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)



Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)



Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

**SIGNATURE of Applicant for Patent**

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature

Date (Optional)

26/05/2021

Name

Title

NPI Services Manager

**NOTE:** Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

Total of forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1480, Alexandria, VA 22313-1480.**

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**Electronic Acknowledgement Receipt**

<b>EFS ID:</b>	42960982
<b>Application Number:</b>	16852790
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5321
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel
<b>Customer Number:</b>	23364
<b>Filer:</b>	Thomas Lee/Yanling Cottle
<b>Filer Authorized By:</b>	Thomas Lee
<b>Attorney Docket Number:</b>	BEEL3004C/TJM
<b>Receipt Date:</b>	11-JUN-2021
<b>Filing Date:</b>	20-APR-2020
<b>Time Stamp:</b>	09:43:24
<b>Application Type:</b>	Utility under 35 USC 111(a)

**Payment information:**

Submitted with Payment	no
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**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	POA_0006USC1.pdf	509713	no	2
			1536290582c0455a2914f0efa0f795cabd53a4ee		

**Warnings:**

**Information:**

**Total Files Size (in bytes):**

509713

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**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

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**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

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**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/852,790	04/20/2020	Koen Simon Herman Beel	21044.0006USC1

**CONFIRMATION NO. 5321**

**POA ACCEPTANCE LETTER**



\*OC000000126288459\*

52835  
HAMRE, SCHUMANN, MUELLER & LARSON, P.C.  
45 South Seventh Street  
Suite 2700  
Minneapolis, MN 55402-1683

Date Mailed: 06/15/2021

**NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY**

This is in response to the Power of Attorney filed 06/11/2021.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/cnguyen/





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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/852,790	04/20/2020	Koen Simon Herman Beel	BEEL3004C/TJM

**CONFIRMATION NO. 5321**

**POWER OF ATTORNEY NOTICE**



23364  
BACON & THOMAS, PLLC  
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ALEXANDRIA, VA 22314-1176

Date Mailed: 06/15/2021

**NOTICE REGARDING CHANGE OF POWER OF ATTORNEY**

This is in response to the Power of Attorney filed 06/11/2021.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/cnguyen/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventorship: BEEL Examiner: BARTELS, CHRISTOPHER  
Serial No.: 16/852790 Group Art Unit: 2184  
Filed: April 20, 2020 Docket No.: 21044.0006USC1  
Title: ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

CERTIFICATE OF TRANSMISSION.

I hereby certify that this paper is being transmitted by EFS Web to the United States Patent & Trademark Office on July 13, 2021.

By: /Thomas Lee/

Name: Thomas Lee

**AMENDMENT AND RESPONSE**

Mail Stop: AMENDMENT  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Dear Commissioner:

In response to the Non-Final Office Action issued January 14, 2021, please amend the above-identified application as follows:

**Amendments to the Claims** are reflected in the listing of claims that begins on page 2 of this paper.

**Remarks** begin on page 7 of this paper.

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**AMENDMENT TO THE CLAIMS**

This listing of claims will replace all prior versions and listings of claims in the application.

**Listing of Claims:**

1-81. (Cancelled)

82. (Currently Amended) A method for connecting a processing device to a communications network, the processing device having a memory, a display, an operating system and communication between processing device and a class of peripheral devices, the method comprising:

a) coupling an external peripheral device physically to a port of the processing device, the external peripheral device having a transceiver and a connector configured to couple to the port of the processing device, and presenting the external peripheral device to the processing device as a human interface device;

b) communicating at least one of audio data and display data from the processing device to the external peripheral device via the human interface device;

c) reading the audio data from the port ~~using an audio device on the external peripheral device,~~

d) connecting the processing device to a communications network via the transceiver, and

e) display data and audio data being routed between the processing device and the communication network via the transceiver and further to a base node.

83. (Previously Presented) The method of claim 82, wherein the audio device comprises an audio output adapter device which is configured as a virtual audio device to transfer the audio data from the processing device to the base node via the communications network.

84. (Currently Amended) The method of claim 82, further comprising presenting the external peripheral device to the processing device as any of the following:

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~~a human interface device; —~~

a mass storage device; and

a composite device.

85. (Previously Presented) The method of claim 82, wherein a client application is stored on the external peripheral device which when run on the processing device obtains screen scraped data.

86. (Previously Presented) The method of claim 85, wherein the client application is a portable application.

87. (Currently Amended) The method of claim 82, wherein the external peripheral device analyzes an incoming audio signal from the processing device and if no audio data is received, the incoming audio signal is discarded and if audio data is received, the external peripheral device initiates a TCP/IP socket connection to the base unit through the communications network.

88. (Previously Presented) The method of claim 82, further comprising time-stamping synchronously a stream of the audio data with a stream of the display data.

89. (Previously Presented) The method of claim 88, further comprising encoding, optionally encrypting the audio data.

90. (Currently Amended) A system for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system and communication between processing device and a class of peripheral devices, the system comprising:

a) means for coupling an external peripheral device physically to a port of the processing device, the external peripheral device having a transceiver and a connector configured to couple to the port of the processing device;

b) means for presenting the external peripheral device to the processing device as a human interface device;

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[[b)]] c) means for at least one of display data communication and audio communication between the external peripheral device and the processing device via the human interface device;

wherein the external peripheral device is configured ~~in a way~~ to connect the processing device to a communications network via the transceiver; and

d) means for routing display data and audio data between the processing device and the communication network via the means for display data and audio data communication and the transceiver to a base node.

91. (Previously Presented) The system of claim 90, wherein the external peripheral device comprises an audio device which is configured in a way to be implemented as a virtual audio device to transfer the audio data from the processing device to the base node via the communications network.

92. (Currently Amended) The system of claim 91, further comprising any of the following:

~~means for presenting the external peripheral device to the processing device as a human interface device;~~

means for presenting the peripheral device to the processing device as a mass storage;  
and

means for presenting the external peripheral device to the processing device as a composite device.

93. (Previously Presented) The system of claim 92, wherein a client application is stored on the external peripheral device which when run on the processing device obtains screen scraped data.

94. (Previously Presented) The system of claim 93, wherein the client application is a portable application.

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95. (Currently Amended) The system of claim 92, wherein the external peripheral device is adapted to analyse an incoming audio signal from the processing device and if no audio is received, the incoming audio signal is discarded.

96. (Previously Presented) The system of claim 95, wherein if audio is received, the external peripheral device is adapted to initiate an additional connection to the base unit through the communications network.

97. (Previously Presented) The system of claim 90, further comprising time-stamping synchronously the audio data with the display data.

98. (Previously Presented) The system of claim 90, further comprising means for encoding, optionally encrypting the audio data.

99. (Currently Amended) A peripheral device for providing communication connectivity to a processing device which is provided with memory, a display and an operating system and for communication between the processing device and a class of peripheral devices, the peripheral device comprising a connection configured to be physically coupled to a port of the processing device and the peripheral device being adapted to work with executable software code, said executable software code comprising:

a fourth software code for presenting the external peripheral device to the processing device as a human interface device;

a first software code portion for setting up, a means for at least one of display data communication and audio data communication between the peripheral device and the processing device via the human interface device;

a second software code portion for connecting the processing device to a communications network via a transceiver of the external peripheral device; [[and]]

a third software code portion for routing the display data and the audio data between the processing device and the communication network via the transceiver to a base node.

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100. (Currently Amended) A method for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system, the method comprising:

a) coupling an external peripheral device physically to a port of the processing device, wherein the peripheral device comprises a wireless transceiver and a connector, said connector configured to couple to the port of the processing device;

b) presenting the external peripheral device to the processing device as a human interface device;

[[b)]] c) setting up one of an audio communication between the peripheral device and the processing device and ~~setting up a display data communication between the peripheral device and the processing device~~ via the human interface device;

[[c)]] d) the peripheral device being configured to connect the processing device to a communications network via the wireless transceiver;

[[d)]] e) routing audio data from the processing device to the wireless transceiver via the connector of the peripheral device and the audio communication and ~~routing display data from the processing device to the wireless transceiver via the connector of the peripheral device and the display data communication;~~

f) routing the ~~display data and the~~ audio data from the wireless transceiver of the peripheral device to a base node over the communications network via at least one channel created between the external peripheral device to the base node.

101. (Previously Presented) The method of claim 100, wherein the external peripheral device is configured to analyze an incoming signal from the processing device and if no audio data is received, the incoming signal is discarded and if audio data is received, the external peripheral device initiates a TCP/IP socket connection to the base unit through the communications network.

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**REMARKS**

Applicant respectfully requests favorable reconsideration of this application in view of the above amendments and the following remarks.

Claim 82 is amended to include certain features from claim 84, where support for the amendment may be found, for example, at least on page 10, lines 11-25 of the specification as originally filed.

Claims 90, 99, and 100 are amended to recite similar features as now recited in mended claim 82.

Claims 84, 87, 92, and 95 are amended to remove any inconsistencies introduced by the amendments to claims 82 and 90.

No new matter has been added.

Claims 82-101 are pending.

Applicant respectfully requests that the specification be amended as requested in the Preliminary Amendment filed April 20, 2020 to add the Cross-Reference of the Applications, which was not included in the publication of the present application in U.S. publication 20200250110.

**Claim Rejections - 35 U.S.C. § 103**

Claims 82-84 and 87-101 are rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Nuyttens et al. (U.S. Patent Application Publication No. 2007/0033289) (“Nuyttens”) in view of Thompson (U.S. Patent Application Publication No. 2009/0247006) (“Thompson”). Applicant respectfully traverses the rejection.

Applicant initially notes that claims 82-101 are currently pending in this application, and does not include claim 102 as indicate on page 8 of the Office Action.

With respect to independent claim 82, Applicant submits that the claim has been amended to recite, at least in part, coupling an external peripheral device physically to a port of the processing device, the external peripheral device having a transceiver and a connector configured to couple to the port of the processing device, presenting the external peripheral device to the processing device as a human interface device, communicating at least one of audio data and display data from the processing device to the external peripheral device via the human interface device, and at least reading the audio data from the port.



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Applicant submits that neither Nuyttens nor Thompson, taken alone or in combination, result in the features now recited in amended claim 82.

Rather, Nuyttens discloses in paragraph [0116]:

The following functional blocks can be used in this DGU 14: the drawing unit 40, the decoding units 41 and the CPU unit 47. These building blocks are connected together via a switching means 46, e.g. via a PClexpress switch. The decoding units 41 execute the same function as in the first embodiment. The single board computer (SBC) of the Hydra in the first embodiment is replaced by the drawing unit 40 and CPU unit 47 in the second embodiment. This separation allows to provide better performance on both the CPU and drawing functionality. The CPU unit 47 is in control of the setup and operation of the DGU unit and can receive commands across a separated control network (out-of-band control) or across the video network (in-band control). The decoding unit 41 receives the encoded information across the gigabit interface, decodes the information and forwards it to the drawing unit 40. The drawing unit 40 renders the information requested in the graphics configuration file, e.g. tagged mark-up language configuration document 61.

Nuyttens also discloses in paragraph [0112]:

The DGU unit receives a number of encoded signals--unicasted or multicasted on the network 13--through the redundant 1 Gb/s network interface in a number of input buffers 30 (RJ45 Magnetics--PHY). The buffered signals are processed in a processor 31 (Network processing--SDRAM--Flash). The received signals are then decoded in a decoder 32 (Codec logic--SDRAM--ADV202) and transferred across the baseboard-mezzanine interface of the multi-viewer driver 2, e.g. Hydra, to the baseboard of the multi-viewer driver 2, e.g. Hydra. This baseboard takes care of inserting the decoded image on the internal bus of the multi-viewer driver 2, e.g. Hydra. A controller block 33 (SDRAM+flash+processor) with an own redundant fast Ethernet network interface 33- to separate streaming and control channels--(RJ45-Mac Phy) is used to control the display generator unit 14. The Hydra Single Board Computer (SBC) is used to render metadata and embedded information.

Thus, Nuyttens only discloses a display generator equipped with a drawing unit, but fails to disclose each and every feature recited in amended claim 82.

As the Examiner suggested on page 5 of the Office Action, since he needed to show “only one element of the group to be shown by the reference to teach the claim,” the Examiner suggested that Nuyttens teaches a storage device in paragraph [0252]. One having ordinary skill in the art, however, would not have observed any evidence in Nuyttens that the external peripheral device is presented to the processing device as a human interface device, where at least one of audio data and display data is communicated from the processing device to the external peripheral device via the human interface device, and the audio data is read from the

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port, as recited in amended claim 82. In so doing, one having ordinary skill in the art would have appreciated that claim 82, as now amended, now refers to connecting the processing device to a communications network. If one having ordinary skill is confronted with connecting a processing device like a laptop to a LAN, one having ordinary skill would have selected the appropriate driver to package the data for transmission, e.g., will use a modem. HID drivers are designed to work with a modem. For example, as discussed in the pending application, an HID (human interface device) is used for capturing user input (e.g. following a user action such as pressing or activating a button) and providing user feedback, e.g. by an optical indicator such as a light ring around the button e.g. an LED ring, for streaming the screen scraped video content to the network and hence to a base unit and a display (page 10, lines 18-22). In so doing, one having ordinary skill would not have observed any evidence in the prior art to select a driver that is not suitable for this job. Rather, only in the present application is one having ordinary skill taught of the peripheral device where it is particularly advantageous and non-obvious to select the HID driver. By doing so it is possible to avoid the network interfaces of the processing device. That is, the processing device does not associate data being transferred by the HID driver with the network interfaces, routing tables, and administrator privileges of the processing device. Thus, such features increase the scalability of the system allowing rapid connection independent of the type of processing device being used, e.g. independent of whether it is a Microsoft Windows or an Apple device using iOS. The claimed system is therefore agnostic by design. On the other hand, as discussed above, while Nuyttens discloses using a storage device, Nuyttens is silent with respect to presenting the external peripheral device to the processing device as the human interface device. In fact, Applicant submits that one having ordinary skill in the art would have appreciated that drivers for a USB connection are device specific and, hence, there is no relationship between the driver for a storage device and for a human interface device. Thus, Nuyttens fails to disclose or suggest the features now recited in amended claim 82.

Thompson fails to cure the deficiencies of the teachings of Nuyttens with respect to amended claim 82, at least because Thompson is only directed providing an in-wall access point enclosure, that will securely accept the insertion of a access point electronics units node consisting of a network communications module (motherboard) and any one of a plurality of application interface cartridge daughter boards that is retained within the module and arranged in a ‘piggy back’ manner (para. [0015]). Thompson also teaches providing a free-standing (e.g., set-

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top box) docking station network communications module that will securely accept the insertion of one or more application interface cartridges (para. [0016]). That is, Thompson only teaches a multimedia system, but fails to disclose each and every feature recited in amended claim 82.

Therefore, since neither Nuyttens nor Thompson discloses or suggests each and every feature now recited in amended claim 82, any proposed modification of the invention of Nuyttens with the teachings of Thompson fails to result in the same combination of features as now recited in amended claim 82. In fact, Applicant submits that one having ordinary skill in the art would not have been prompted by the prior art to modify the teachings of Nuyttens or Thompson, taken alone or in combination, to result in the specific combination of features as recited in amended claim 82, at least because both Nuyttens and Thompson are directed to different methods and structures for networking.

Claims 90, 99, and 100 are allowable over the cited prior art at least for reciting similar features as recited in the method of amended claim 82, as well as their individually recited features.

The remaining claims are allowable over the cited prior art at least based on their dependencies of claims 82, 90, and 100 as well as their individually recited features. Applicant does not concede the correctness of the rejection for claim features not discussed.

Applicant respectfully requests favorable reconsideration of the claim and withdrawal of the rejection.

Claims 85 and 86 are rejected under U.S.C. 103(a) as being unpatentable over Nuyttens in view of Thompson, and further in view of Carlson et al. (U.S. Patent Application Publication No. 2013/0060662) (“Carlson”). Applicant respectfully traverses the rejection.

Claims 85 and 86 depend from claim 82. Accordingly, claims 85 and 86 are also patentable over the combination of the invention of Nuyttens in view of Thompson for at least the same reasons as amended claim 82, where Carlson does not remedy the deficiencies of Nuyttens and Thompson with respect to amended claim 82. Applicant does not concede the correctness of the rejection for claim features not discussed. Applicant respectfully requests favorable reconsideration of the claim and withdrawal of the rejection.

In view of the above, Applicant respectfully requests favorable reconsideration in the form of a Notice of Allowance. If any questions arise regarding this communication, the

16/852790

Response to Office Action dated 1/14/2021

Examiner is invited to contact Applicant's representative listed below. Please charge any underpayment of fees or credit any overpayment to Deposit Account No. 50-3478.

Respectfully submitted,

HAMRE, SCHUMANN, MUELLER &  
LARSON, P.C.  
45 S. 7<sup>th</sup> St., Suite 2700  
Minneapolis, MN 55402  
(612) 455-3800

Dated: July 13, 2021

By:       /Thomas Lee/        
Thomas Lee  
Reg. No.: 66,396  
TL/ajs

<b>PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)</b>		Docket Number (Optional) 21044.0006USC1
Application Number <b>16/852790</b>	Filed <b>April 2, 2020</b>	
For <b>ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS</b>		
Art Unit <b>2184</b>	Examiner <b>BARTELS, CHRISTOPHER</b>	

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	<u>Fee</u>	<u>Small Entity Fee</u>	<u>Micro Entity Fee</u>	
<input type="checkbox"/> One month (37 CFR 1.17(a)(1))	\$220	\$110	\$55	\$ _____
<input type="checkbox"/> Two months (37 CFR 1.17(a)(2))	\$640	\$320	\$160	\$ _____
<input checked="" type="checkbox"/> Three months (37 CFR 1.17(a)(3))	\$1,480	\$740	\$370	\$ <b>1480</b>
<input type="checkbox"/> Four months (37 CFR 1.17(a)(4))	\$2,320	\$1,160	\$580	\$ _____
<input type="checkbox"/> Five months (37 CFR 1.17(a)(5))	\$3,160	\$1,580	\$790	\$ _____

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29.  
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☒ The Director has already been authorized to charge fees in this application to a Deposit Account.

☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to  
Deposit Account Number 503478.

☒ Payment made via EFS-Web.

**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**

I am the

☐ applicant.

☒ attorney or agent of record. Registration number 66396.

☐ attorney or agent acting under 37 CFR 1.34. Registration number \_\_\_\_\_.

/Thomas Lee/ July 13, 2021

Signature Date

THOMAS LEE 6124553844

Typed or printed name Telephone Number

**NOTE:** This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below\*.

☐ \* Total of \_\_\_\_\_ forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public, which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**Electronic Patent Application Fee Transmittal**

<b>Application Number:</b>	16852790			
<b>Filing Date:</b>	20-Apr-2020			
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS			
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel			
<b>Filer:</b>	Thomas Lee			
<b>Attorney Docket Number:</b>	21044.0006USC1			
Filed as Large Entity				
<b>Filing Fees for    Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension - 3 months with \$0 paid	1253	1	1480	1480
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>1480</b>



**Electronic Acknowledgement Receipt**

<b>EFS ID:</b>	43240359
<b>Application Number:</b>	16852790
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5321
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel
<b>Customer Number:</b>	52835
<b>Filer:</b>	Thomas Lee
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	21044.0006USC1
<b>Receipt Date:</b>	13-JUL-2021
<b>Filing Date:</b>	20-APR-2020
<b>Time Stamp:</b>	18:06:15
<b>Application Type:</b>	Utility under 35 USC 111(a)

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			7ee8d438ed99cc1c3a0e1c6e12e3b12748793cde		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
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Warnings:					
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Doc code: IDS

PageID #: 3777

PTO/SB/08a (02-18)

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	16852790
	Filing Date	2020-04-20
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	Christopher Bartels
	Attorney Docket Number	21044.0006USC1

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	1	101572794	CN		2009-11-04	SHENZHEN HUAWEI COMM TECH CO	English Abstract	
	2	101917402	CN		2010-12-15	CHINA ELECTRIC POWER RES INST		×

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16852790

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Christopher Bartels
Attorney Docket Number	21044.0006USC1

3	1317112	CN	2001-10-10	SEIKO EPSON CORP		<input checked="" type="checkbox"/>
4	102065267	CN	2011-05-18	LG ELECTRONICS INC	English Abstract	<input type="checkbox"/>
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	1	Office Action in related Chinese Office application 202010418842.4 dated May 28, 2021 (17 pages).	<input checked="" type="checkbox"/>
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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	16852790
	Filing Date	2020-04-20
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	Christopher Bartels
	Attorney Docket Number	21044.0006USC1

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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

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☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

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A certification statement is not submitted herewith.

### SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2021-07-14
Name/Print	THOMAS LEE	Registration Number	66396

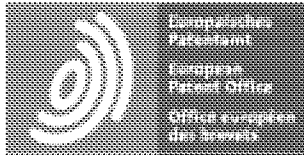
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## Espacenet

CN1609780A Systems and methods for projecting content from computing devices

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Inventors: FULLER ANDREW J [US], MANION TODD R [US], SOIN RAVIPAL S [US], WILLIAM MAK [US], ZINK RONALD O [US]

Classifications:

IPC **G06F13/00; G06F15/16; G06F15/173; G06F17/00; G06F19/00; G06F3/00; G06F3/033; G06F3/048; G06F3/14; G08C17/02; G09G5/00; (IPC1-7): G06F3/14;**

CPC **G06F15/16 (KR); G06F3/14 (KR); G06Q50/10 (KR); G09G5/006 (EP);**

Priorities: US51433803P 2003-10-24; US78683304A 2004-02-25

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Systems and methods for projecting content from computing devices

### Abstract

Systems and methods are provided that enable an alternate display device to wirelessly receive content from a computing device, freeing users from the burden of physically connecting the computing device via a cable. The content sent to the display device can also be simultaneously or separately viewed on the computing devices of other nearby computing devices. Generic mechanism(s) and corresponding user interfaces are provided for computing devices to engage in discovery of devices to which content may be delivered, for accepting delivery and for initiating transmission of content.



[19] 中华人民共和国国家知识产权局

[51] Int. Cl.<sup>7</sup>  
G06F 3/14



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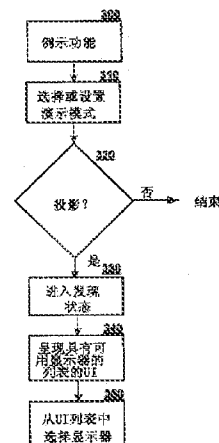
[74] 专利代理机构 上海专利商标事务所有限公司  
代理人 谢喜堂

权利要求书 11 页 说明书 35 页 附图 15 页

[54] 发明名称 用于投影来自计算装置的内容的系统和方法

[57] 摘要

提供了系统和方法，使备用显示器装置能够无线地从计算装置接收内容，把用户从物理地经由电缆连接计算装置的负担中解放出来。要发送给所述显示装置的内容，还可以同时地或独立地在另一个邻近计算装置的计算装置上被观看。为计算装置提供了通用装置和相应的用户界面，以使其发现内容所要传送的装置，用于接受传送并用于开始内容的发送。



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1. 一种把内容从一个计算装置投影到备用显示器装置的方法，其特征在于，包括：

通过用户界面装置显示对应于可用的备用显示器装置的至少一个指示；

通过用户界面装置，从所述至少一个指示指示出为可用的备用显示器装置中选择至少一个备用显示器装置；以及

把所述内容传送到所选择的至少一个备用显示器装置。

2. 如权利要求 1 所述的方法，其特征在于，还包括：

根据发现协议发现能够接收所述内容的可用的备用显示器装置。

3. 如权利要求 1 所述的方法，其特征在于，所述传送包括，借助于远程协议在所述计算装置和所选的至少一个备用显示器装置之间建立远程对话。

4. 如权利要求 3 所述的方法，其特征在于，所述远程协议是远程桌面协议，所述远程对话是终端服务(TS)对话。

5. 如权利要求 1 所述的方法，其特征在于，还包括：当在所选择的至少一个备用显示器装置上呈现时，指明所述内容的至少一部分要隐藏。

6. 如权利要求 1 所述的方法，其特征在于，所述传送包括，当呈现所述内容时，传送要被呈现在所选择的至少一个备用显示器装置上的附加内容。

7. 如权利要求 6 所述的方法，其特征在于，所述附加内容输入到所述计算装置，以便作为正被呈现的内容上的一个亮点显示。

8. 如权利要求 7 所述的方法，其特征在于，所述附加内容是在所述至少一个备用显示器装置的显示器上被显示成 (A) 色点、(B) 激光指针和 (C) 带有轨迹的指针中的任一种的所述计算装置的鼠标输入。

9. 如权利要求 1 所述的方法，其特征在于，所述传送包括：

传送对传送内容的请求到所选择的至少一个备用显示器装置中的备用显示器装置；以及

等待来自根据所述传送而允许内容的传送的备用显示器装置的响应。

10. 如权利要求 1 所述的方法，其特征在于，响应于所述传送，所述内容基本上同时地显示在所选择的至少一个备用显示器装置上。

11. 如权利要求 2 所述的方法, 其特征在于, 所述发现协议是通用即插即用 (UPnP) 协议。

12. 如权利要求 1 所述的方法, 其特征在于, 还包括借助于所述用户界面指定根据所述传送而要传送到所选择的至少一个备用显示器装置的内容。

13. 如权利要求 3 所述的方法, 其特征在于, 还包括, 为所述计算装置和所选择的至少一个备用显示器装置之间的每个远程对话, 通过用户界面显示与所述远程对话相关联的信号强度的指示。

14. 如权利要求 13 所述的方法, 其特征在于, 根据障碍物、距离和要维持的数据速率中的至少一个, 为每个远程对话示出信号品质的预定水平数。

15. 如权利要求 13 所述的方法, 其特征在于, 还包括储存与远程对话的信号强度相关联的文件。

16. 一种计算机可读介质, 其特征在于, 包括计算机可执行模块, 具有用于执行权利要求 1 所述的方法的计算机可执行指令。

17. 一种计算装置, 其特征在于, 包括用于执行权利要求 1 所述的方法的装置。

18. 一种载有用于执行权利要求 1 所述的方法的计算机可执行指令的已调数据信号。

19. 至少一个计算机可读介质, 其包括计算机可执行指令, 用于实施与具有能够根据至少一个投影协议被投影到其他计算装置上的内容的计算装置的用户相连接的方法, 该方法包括:

在计算装置上显示用户界面;

发现是否有至少一个备用显示器装置能够根据所述至少一个投影协议接收该内容; 以及

根据所述发现, 如果至少一个备用显示器装置能够接收所述内容, 则通过所述用户界面显示所述至少一个备用显示器装置的至少一个指示。

20. 如权利要求 19 所述的至少一个计算机可读介质, 其特征在于, 所述方法还包括: 通过所述用户界面选择所述内容。

21. 如权利要求 19 所述的至少一个计算机可读介质, 其特征在于, 所述发现包括, 发现是否有至少一个备用显示器装置能够根据所述至少一个投影协议

接收所述内容。

22. 如权利要求 19 所述的至少一个计算机可读介质，其特征在于，所述发现包括发现对应于所述至少一个备用显示器装置的至少一个网际协议 (IP) 地址。

23. 如权利要求 19 所述的至少一个计算机可读介质，其特征在于，所述发现包括，检测根据通用即插即用 (UPnP) 协议通知其存在至少一个备用显示器装置。

24. 如权利要求 19 所述的至少一个计算机可读介质，其特征在于，所述方法还包括：

通过所述用户界面选择所述至少一个指示中的一个指示；以及  
控制与所选指示相关联的备用显示器装置的特征。

25. 如权利要求 24 所述的至少一个计算机可读介质，其特征在于，所述控制包括根据远程桌面协议 (RDP) 进行控制。

26. 如权利要求 19 所述的至少一个计算机可读介质，其特征在于，所述方法还包括：

通过所述用户界面选择所述至少一个指示中的一个指示；以及  
创建到与所选指示相关联的备用显示器装置的远程连接。

27. 如权利要求 26 所述的至少一个计算机可读介质，其特征在于，所述方法还包括：

经由所述远程连接，将内容传送到与所选指示相关联的所述备用显示器装置。

28. 如权利要求 26 所述的至少一个计算机可读介质，其特征在于，所述创建包括下述中的至少一个：(A) 创建与所述备用显示器装置的终端服务对话，以及 (B) 创建与通用即插即用 (UPnP) 技术的远程连接。

29. 如权利要求 19 所述的至少一个计算机可读介质，其特征在于，所述方法还包括：

通过所述用户界面选择所述至少一个指示中的一个指示；以及  
破坏到与所选指示相关联的备用显示器装置的远程连接。

30. 至少一个计算机可读介质，其包括计算机可执行指令，用于实施与具

有能够显示独立的内容、有效地分散所述计算装置的显示的多个显示器的计算装置的用户相连接，该方法包括：

在所述计算装置的多个显示器中的第一个显示器上显示一用户界面；

根据至少一个扩展协议，发现是否至少一个备用显示器装置能够接收与所述计算装置的多个显示器中的一个显示器的至少一部分相关联的内容；以及

根据所述发现，如果至少一个备用显示器装置能够接收所述内容，则通过所述用户界面显示所述至少一个备用显示器装置的至少一个指示。

31. 如权利要求 30 所述的至少一个计算机可读介质，其特征在于，所述方法还包括：

通过用户界面，选择多个显示器中的一个显示器的至少一部分；

通过所述用户界面选择所述至少一个指示中的一个指示；

创建到与所选指示相关联的备用显示器装置的远程连接；以及

把至少一部分显示经由所述远程连接传送到与所选指示相关联的所述备用显示器装置。

32. 如权利要求 31 所述的至少一个计算机可读介质，其特征在于，所述创建包括创建与所述备用显示器装置的终端服务对话。

33. 如权利要求 31 所述的至少一个计算机可读介质，其特征在于，所述传送包括，传送由至少一部分显示所收到的输入，作为在所述备用显示器装置上的特定指示。

34. 如权利要求 33 所述的至少一个计算机可读介质，其特征在于，所述传送包括，传送由多个显示器中的一个显示器的至少一部分所收到的输入，作为在所述备用显示器装置上的彩色标志。

35. 如权利要求 30 所述的至少一个计算机可读介质，其特征在于，所述发现包括，发现是否有至少一个备用显示器装置能够根据所述至少一个扩展协议接收所述计算装置的至少一部分显示。

36. 如权利要求 30 所述的至少一个计算机可读介质，其特征在于，所述发现包括发现对应于所述至少一个备用显示器装置的至少一个网际协议(IP)地址。

37. 如权利要求 30 所述的至少一个计算机可读介质，其特征在于，所述发

现包括，检测根据通用即插即用（UPnP）协议通知其存在的至少一个备用显示器装置。

38. 如权利要求 30 所述的至少一个计算机可读介质，其特征在于，所述方法还包括：

通过所述用户界面选择所述至少一个指示中的一个指示；以及  
控制与所选指示相关联的备用显示器装置的特征。

39. 如权利要求 38 所述的至少一个计算机可读介质，其特征在于，所述控制包括根据远程桌面协议（RDP）进行控制。

40. 如权利要求 30 所述的至少一个计算机可读介质，其特征在于，所述方法还包括：

通过所述用户界面选择所述至少一个指示中的一个指示；以及  
破坏到与所选的指示相关联的所述备用显示器装置的远程连接。

41. 至少一个计算机可读介质，其包括计算机可执行指令，用于执行从第一计算装置传送内容到用于操作或进行呈现的至少一个第二计算装置的方法，所述方法包括：

发现可用来从包括所述至少一个计算机可读介质的第一计算装置接收内容的至少一个第二装置，所述至少一个第二装置包括下述中的至少一个：（A）至少一个可用的无线投影仪，以及（B）至少一个可用的其他计算机；

根据所述发现，通过用户界面显示反映了所发现的为可用的至少一个第二装置的列表；

从所述列表选择一个装置；

建立与所述装置的远程计算对话；以及

根据与远程计算对话相关联的协议将内容传送到所述装置。

42. 如权利要求 41 所述的至少一个计算机可读介质，其特征在于，所述方法还包括：通过用户界面，配置一设置，其中该设置控制根据所述建立而建立的所述远程计算对话的至少一个特征。

43. 一种把内容从第一计算装置投影到至少一个其他计算装置的方法，其特征在于，包括：

把所述第一计算装置设置成演示模式；



在所述第一计算装置上例示与内容投影相关联的软件功能；

根据发现模式发现是否有至少一个其他计算装置可以用来接收和显示投影内容；

如果发现至少一个其他计算装置，则显示反映了可用的至少一个其他计算装置的用户界面；

通过所述用户界面，进行下述活动中的一种：（A）选择投影内容，（B）选择用于投影的目标装置，和（C）配置投影特征。

44. 如权利要求 43 所述的方法，其特征在于，所述例示包括，例示与下述中的内容投影相关联的软件功能：（A）在第一计算装置的启动时，（B）作为所述把第一计算装置设置成演示模式的一部分。

45. 如权利要求 43 所述的方法，其特征在于，所述设置包括通过任一下述方法把第一计算装置设置成演示模式：（A）在开始菜单下的菜单单元，（B）所述用户界面的用户界面装置的顶层，（C）显示条部分，（D）快捷方式，和（E）工具条。

46. 如权利要求 43 所述的方法，其特征在于，所述配置包括下述中的至少一种：（A）设置用于所述投影的密码，（B）选择克隆模式或扩展模式，（C）选择屏幕分辨率，和（D）选择视频或音频与视频。

47. 如权利要求 46 所述的方法，其特征在于，至少进行下述中的一种，（A）所述选择克隆模式或扩展模式默认为克隆模式，（B）所述选择屏幕分辨率默认为当前设置，和（C）所述选择视频或音频与视频默认为音频与视频。

48. 如权利要求 43 所述的方法，其特征在于，所述把第一计算装置设置成演示模式包括执行操作系统任务。

49. 如权利要求 48 所述的方法，其特征在于，所述执行操作系统任务包括下述中的至少一种：（A）关闭通知，（B）关闭屏幕空白，（C）防止来自除了要被投影的所述内容之外的来源的音频，（D）改变电源分配/保护的特征，（E）改变桌面背景，和（F）改变屏幕分辨率。

50. 如权利要求 43 所述的方法，其特征在于，根据发现模式的所述发现，包括在设置了演示模式之后的进行预定时间的发现。

51. 如权利要求 43 所述的方法，其特征在于，根据发现模式的所述发现，

在第一计算装置的后台进程中发生而不需任何用户干预。

52. 如权利要求 43 所述的方法，其特征在于，所述显示包括，通过所述用户界面显示下述内容中的至少一个：(A) 投影的状态，(B) 从至少一个其他计算装置断开连接的能力的指示，(C) 其他附加装置可用的指示，(D) 根据所述发现而发现的至少一个其他计算装置目前不能接收内容的指示，和 (E) 可以被选择的最近使用的 (MRU) 其他装置的指示，以省略用于所述最近使用的其他装置的发现。

53. 如权利要求 43 所述的方法，其特征在于，还包括：

对内容制定一名称和密码，从而如果从选定的用于投影的目标装置收到该名称和密码，则所述内容仅被传送到该所选的目标装置。

54. 如权利要求 43 所述的方法，其特征在于，还包括响应于所述选择内容以进行投影以及所述选择目标装置用于投影，在所述第一计算装置和所述目标装置之间创建远程对话，并把所述内容通过所述远程对话投影到所述目标装置。

55. 一种计算机可读介质，包括计算机可执行模块，其具有用于执行权利要求 43 所述的方法的计算机可执行指令。

56. 一种计算装置，其包括用于执行权利要求 43 所述的方法的装置。

57. 一种载有用于执行权利要求 43 所述的方法的计算机可执行指令的已调数据信号。

58. 一种服务器计算装置，用于把内容从所述服务器计算装置投影到客户显示器装置，其特征在于，包括：

发现部件，根据发现协议运行，以发现并控制能够接收所述内容的可用的客户显示设备；

远程对话部件，根据至少一个远程协议运行，以在所述服务器计算装置和可用的客户显示器装置之间建立远程对话，对用于投影的内容进行打包，并将打包内容传送到所选的客户显示器装置；

用户界面部件，用于下述中的至少一个，(A) 显示对应于由所述发现部件发现并能够控制的可用的客户显示器装置的至少一个指示，以及 (B) 接收目标客户显示器装置的指示的选择和内容的选择，由此所述远程对话部件为所述目



标客户显示器装置以及所述服务器计算装置创建远程对话，并且所述内容被投影到所述目标客户显示器装置。

59. 如权利要求 58 所述的服务器计算装置，其特征在于，所述发现部件根据所述发现协议发现通告了可用性的客户显示器装置。

60. 如权利要求 58 所述的服务器计算装置，其特征在于，所述至少一个远程协议包括远程桌面协议，所述远程对话是终端服务(TS)对话。

61. 如权利要求 58 所述的服务器计算装置，其特征在于，在发送内容到一选定的客户显示器装置以前，所述远程对话部件先发送一个授权请求到所述选定的客户显示器装置，并等待授权传送内容的选定的客户显示器装置的响应。

62. 如权利要求 58 所述的服务器计算装置，其特征在于，所述发现协议是通用即插即用(UPnP)协议。

63. 一种用于连接一计算装置到一备用显示器装置以便把内容从所述计算装置投影到所述备用显示器装置的方法，其特征在于，包括：

根据发现协议发现能够接收并呈现投影内容的至少一个备用显示器装置；  
选择要投影的内容，和从所述至少一个备用显示器装置中选择一个备用显示器装置，由此所选定的内容将被投影到所选定的备用显示器装置；以及  
在所述计算装置和所选定的备用显示器装置之间建立连接。

64. 如权利要求 63 所述的方法，其特征在于，所述建立连接包括：  
利用所述计算装置的远程接头部件生成一个票；  
把该票传送给所选定的备用显示器装置；以及  
利用所述远程接头部件接收对所述传送的响应。

65. 如权利要求 64 所述的方法，其特征在于，所述票包括下述至少之一：  
(A) 关于如何连至所述计算装置的信息，和(B)关于以何种模式连接的信息。

66. 如权利要求 65 所述的方法，其特征在于，所述模式包括投影模式、扩展桌面模式和用于特定应用的模式中的至少一种。

67. 如权利要求 63 所述的方法，其特征在于，还包括： 通过所述连接把所述选定内容传送给所选定的备用显示器装置。

68. 如权利要求 63 所述的方法，其特征在于，所述发现包括检测来自一备用显示器装置的接收投影内容的能力的至少一个通告。

69. 如权利要求 63 所述的方法，其特征在于，所述发现包括，通过所述发现协议发出对特定类型装置的搜索请求，由此收到所述搜索请求的所述特定装置的全部装置都通过发送消息给所述计算装置来响应。

70. 如权利要求 63 所述的方法，其特征在于，还包括，在发现至少一个备用显示器装置中的一个备用显示器装置之后，下载所述备用显示器装置的服务文档到所述计算装置。

71. 一种计算机可读介质，包括计算机可执行模块，其具有用于执行权利要求 63 所述的方法的计算机可执行指令。

72. 一种计算装置，其包括用于执行权利要求 63 所述的方法的装置。

73. 一种载有用于执行权利要求 63 所述的方法的计算机可执行指令的已调数据信号。

74. 一种用于控制备用显示器装置的方法，其特征在于，包括：

在计算装置和备用显示器装置之间建立一个连接，用于把内容从所述计算装置投影到所述备用显示器装置；

从所述备用显示器装置接收一识别所述备用显示器装置和所述计算装置之间的所述投影对话的对话标记，并对所述计算装置进行认证，以控制所述备用显示器装置的投影对话；以及

根据对对话标记的认证来控制所述备用显示器装置。

75. 如权利要求 74 所述的方法，其特征在于，所述控制至少包括下述中的一个，(A) 断开所述连接，(B) 为所述投影对话改变所述显示设置，(C) 为所述投影对话检索所述显示设置，(D) 把控制所述备用显示器装置的权限转移给第三方装置，和 (E) 中断在所述备用显示器装置上的所述投影对话。

76. 一种利用计算装置接收来自一内容发送装置的投影内容的方法，其特征在于，包括：

通过计算装置的用户界面装置确定计算装置可以用来接收投影内容；以及借助于发现协议，广播所述计算装置的可用性，以便正在寻找可用的备用显示器装置的内容发送装置接收该机器可用的指示。

77. 如权利要求 76 所述的方法，其特征在于，还包括：

响应于所述广播，从所述内容发送装置接收对投影内容的请求；

通过所述用户界面确定所述请求是否被接受；

将所述请求是否被接受传送到所述内容发送装置；以及

如果接受所述请求，则从所述内容发送装置接收内容。

78. 如权利要求 77 所述的方法，其特征在于，还包括：在计算装置的显示器上显示所述内容。

79. 如权利要求 78 所述的方法，其特征在于，所述显示器包括在所述显示器上显示除了所述内容之外的备用内容。

80. 一种用于使一备用显示器装置能够从计算装置接收内容的方法，其特征在于，包括：

接收经由网络从所述计算装置传送所述内容的请求；

响应于所述接收、通过用户界面接受所述请求，并建立与所述计算装置的远程计算对话；以及

在网络上从所述计算装置接收所述内容。

81. 如权利要求 80 所述的方法，其特征在于，还包括：呈现从所述计算装置接收的所述内容。

82. 如权利要求 81 所述的方法，其特征在于，所述呈现包括，根据位于所述备用显示器装置的可访问的基本设施呈现所述内容。

83. 如权利要求 81 所述的方法，其特征在于，所述呈现包括，根据多语种的用户界面呈现所述内容以便根据另一种语言显示所述内容。

84. 一种用于使备用显示器装置从计算装置接收内容的方法，其特征在于，包括：

通过用户界面请求从所述计算装置接收投影内容；

发送从所述计算装置接收投影内容的请求；

从所述计算装置接收响应，包括建立一个与所述计算装置的远程计算对话的信息；

根据所述信息建立与所述计算装置的远程计算对话；以及

无线地从所述计算装置接收所述内容。

85. 一种用于把内容从多个计算装置投影到一个备用显示器装置的方法，其特征在于，包括：

根据发现协议发现能够接收并呈现投影内容的备用显示器装置；

通过远程协议，在所述多个计算装置中的第一计算装置和所述备用显示器装置之间建立远程对话；

通过所述远程对话，从所述第一计算装置传送第一内容到所述备用显示器装置；

通过所述第一计算装置的第一显示器呈现所述第一内容；

通过所述远程对话，从所述第二计算装置发送第二内容到所述备用显示器装置；以及

通过第二计算装置的第二显示器呈现第二内容。

86. 如权利要求 85 所述的方法，其特征在于，所述远程协议是远程桌面协议，所述远程对话是终端服务(TS)对话。

87. 如权利要求 85 所述的方法，其特征在于，所述第一内容的呈现基本上与所述第一内容的传送同时发生。

88. 如权利要求 85 所述的方法，其特征在于，所述发现协议是通用即插即用(UPnP)协议。

## 用于投影来自计算装置的内容的系统和方法

### 相关申请的交叉引用

本申请要求于2003年10月24日所提交的、名称为“Systems and Methods for Projecting Content from Computing Devices”的、号码为60/514,338 (MSFT-2843/300525.01)的美国临时专利申请的权益。该申请涉及了共同转让未决的于2004年2月25日所提交的、号码为XX/YYY,YYY (MSFT-3501/300585.03)名称为“Systems and Methods for Projecting Content from Computing Devices”的美国专利申请,于2002年6月25日提交的、号码为10/179,431名称为“Data Projection System and Method”的美国专利申请,和于2003年10月23日所提交的、号码为10/692,384名称为“One to Many Data Projection System and Method”的美国专利申请。

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### 发明领域

本发明涉及了允许从计算装置到诸如投影仪这样的备用显示器上的内容的无线投影的方法和用户界面。

### 背景

个人计算机和便携式/移动式计算装置,诸如便携式计算机,平板计算机(Tablet computer),笔记本计算机,辅助笔记本计算机(sub-notebook computers)和手持式计算装置等等,以及其他现在和将来的便携式/移动式计算装置的变体,有时被用来把内容传输到用于操作或进行呈现的第三方装置。此处,这种便携式或移动式计算装置将被简单地没有限制地称为“移动式计算装置”或“移动装置”。例如,移动装置可被用于诸如会议这样

的情况，以在会议环境中的显示器上显示报告，诸如在象投影仪或监视器这样的大号显示面上。目前，在出现这种情况的时候，利用移动式计算机作报告的用户物理地通过电缆把所述便携式/移动式计算机连接到投影仪或控制所述投影仪的中间电子控制系统上。然而，想要在会议室作报告（present）的膝上计算机用户，必须坐在靠近投影仪地方，控制并切换 VGA 和可能还有音频电缆，以作报告。电线通常不够长，因此每个想要做报告的人为了离投影仪足够近以便插上他们的膝上计算机，都会移到靠近投影仪的地方，这就会在每次报告之间产生抢座位游戏的效应。每次新的报告者控制了所述投影仪显示器，则用户都可能必须调整屏幕分辨率和/或音频设置。此外，理想地，用户想要把他们的显示不仅投影到会议室投影仪上还投影到会议室内的各参加者的膝上计算机上。

然而，由于种种原因，人们并不想物理地连接一电缆。首先，需要移动式计算装置的用户知道移动式计算装置能够连接和如何连接所述移动式计算装置，即，知道他们的移动式计算装置包括一接头或端口用于安装所述投影仪电缆，而且这种连接加上某一模糊按键组合（例如功能键加上 F5 键）能把便携式或移动式计算装置的输出从所述移动式计算装置的正常显示转换到所述端口。第二，任何时候，在计算过程中引入一个或多个物理步骤，都会增加完成该步骤所花费的时间。例如，用户必须把移动装置带到电缆处，连上电缆，并固定住所述连接，以便不会轻易断开。而且，就公与母接头部件是物理部件来说，他们常遭受机械损伤，和自然损耗。例如，所述接头的插脚常会变得弯曲、损坏、金属疲劳等等，无论在哪种情况下所述接头部件，公或母接头中的一个，都不能正常地起到作用。

此外，最终发送给投影仪的所述内容/数据不能同时在会议参加者的计算机上观看。当无线技术在市场上迅速地走向高潮时，目前，没有通用装置用于通过诸如投影仪这样的显示器接收无线数据。而且没有通用装置用于移动装置以无线地传输内容到显示器，诸如投影仪。更进一步地，没有通用装置用于第三方计算装置来接收内容。

因此，在本领域中有这样一种需求，即，把无线技术增加到投影仪上以允许移动用户容易地进行访问，提供了把多个移动用户集合到同一用于合作会议的房间并提供有线解决方案不是实际的无缝连接的能力。此外，在本领



域中有这样一种需求，即消除与架线有关的问题，使投影仪较容易地安装和整理，而在超过一较长距离时不会使信号恶化。而且，在本领域中有这样一种需求，即在多个移动装置源之间进行转换，例如，多人利用他们的移动装置做报告。人们还期望提供一种装置和相应的用户界面以允许用户发现可用的无线投影仪或其他计算机，改变或启用设置并把指定内容连接于其上。类似地，在所述接收端，人们期望包括一种装置和相应的用户界面用于其他计算机的用户从源移动式计算机接收“投影”内容/数据。

#### 发明概要

考虑到本领域中的上述缺点，本发明提供了这样的系统和方法，其使备用显示器装置能够无线地从计算装置接收内容，把用户从经由电缆物理地连接计算装置的负担中解放出来。在另一方面，能够被发送给显示设备的内容还可以在其他靠近该计算装置的计算装置上同时地或分别地观看。在不同的实施例中，本发明包括用于计算装置的通用装置和用户界面以使其能够发现可向其传递内容的装置，用于接收合适的内容的传输和用于开始内容的传输。

本发明的其他优点和特征描述如下。

#### 附图的简短说明

参照附图，进一步描述用于根据本发明的无线投影内容的系统和方法，其中：

图 1 是说明一种典型的现有技术方案的示范性的方框图；

图 2A 是表示一种具有多种计算装置的示例性网络环境的方框图，其能够实施本发明；

图 2B 和 2C 是表示能够实施本发明的示例性而不是限制性计算装置的框图；

图 3 示出了根据本发明运行一无线投影应用程序的示例性顺序；

图 4A 和 4B 说明了结合本发明所用的示范性体系结构；

图 5 示出了一种示例性的流程图，其关于用于连接备用显示器装置的处理；

图 6 示出了一种示例性的流程图，其关于用于控制备用显示器装置的处理；

图 7A — 7H, 示出了根据本发明的示例性的非限制性的各种用户界面方案的屏幕快照;以及

图 8A — 8C 示出了根据本发明的各种方案的示例性的非限制性的屏幕快照, 其示出了公开的和非公开的内容之间的区别。

#### 发明的详细说明

##### 概述

本发明是要允许显示设备, 诸如投影仪或大型显示监视器, 无线地从计算装置接收内容的系统和方法, 把用户从物理地经由电缆连接计算装置的负担中解放出来。 另一方面, 能够被发送给显示装置的内容, 还可以同时地或独立地在另一个邻近计算装置的计算装置上被观看。 在各种具体实施例中, 投影仪具有无线功能, 允许计算装置按顺序地把内容无线地发送给投影仪, 例如, 可用于合作会议和会议报告。 由于消除了架线的问题, 所以比较容易安装投影仪, 在有效距离内没有减少内容并且在多个计算装置信号源之间的换接变得更为方便。 从而, 内容报告者在无线技术的信号能力之内可以更加灵活, 而不会受诸如“投影仪附近”或“墙上插座附近”这样的物理位置的束缚。

##### 定义

下列定义, 应该被认为是对考虑一个或多个此处所用的术语的帮助, 而不是试图限制如本领域普通技术人员所了解的任一术语的较广的含义。

Wi - Fi (无线保真度): Wi - Fi 技术提供了利用无线电技术的联网技术。 Wi - Fi 网络在未经当局许可的 2.4 到 5 GHz 无线电频带内运行, 其具有以 11Mbps 传输数据的能力, 然而通常传递 7 Mbps 的实际数据通过量。 这就提供了类似于用于许多机关的 basic 10 Base - T 有线以太网的性能。 根据本发明的备用显示器装置包括, 但不局限于, Wi - Fi 802.11b 技术, 其为当前在投影仪和计算机产业中最常见的无线通信形式。

对等 (Peer - to - Peer) (Ad Hoc): 无线结构, 其中一个或多个计算机能够共享具有相同无线性能的投影仪。 对等, 意思是每个投影仪用户都具有相同的能力并且每个用户都能够启动与所述投影仪(或理论上彼此)的通信对话。 Ad hoc, 是拉丁文, 意思指‘为这’或‘只为该目的’, 含有临时或自发装置的意思, 如出入报告室的移动无线计算机的情况。 该装



置允许所有用户进行同样的访问并由此使合作会议或共享报告成为可能。

备用显示器装置，或投影仪装置：所述投影仪装置使用终端服务（Terminal Service）和 UPnP。该装置揭露了 MRM 装置用来控制所述装置并经由终端服务（Terminal Services）建立连接的方法。其可以是实际投影仪或别的装置，诸如连于投影仪上的膝上型电脑。

RA：远程辅助设备。

终端服务（TS）：终端服务负责用来“stream”用户屏幕的协议。

UPnP 装置主机和控制点：通用即插即用（UPnP）协议用于该装置的发现。此外，该装置是 UPnP 装置主机服务内被处理的。

RDP Salem 层：所述 RDP Salem 层了解用于建立连接的远程辅助设备的“票”。

用于 TS 的 Salem 层：Salem 层是用于远程辅助设备的当前票生成层。

示例性网络和分布式环境

本领域中普通技术人员可以明白，能够结合任一能够作为计算机网络的一部分而展开或在分布式计算环境中的计算机或其他客户或服务装置来实现本发明。关于这一点，本发明适合于任一计算机系统或具有许多存储器或存储单元的环境，以及许多跨许多存储单元或卷（volume）发生的应用程序和/或处理，其可以根据本发明用在内容的无线发送方面。本发明可以适用于这样一种环境，其带有在网络环境或分布式计算环境中所使用的具有远程的或本地存储的服务计算机和客户计算机。本发明还可以被用于独立的计算装置，其具有编程语言功能、用于产生、接收和发送关于远程或本地服务的信息的解释以及执行的能力。随着用于数字介质的网络源的激增，本发明尤其涉及了那些在网络或分布式计算环境中运行的计算装置，因此在所述环境中能够高效地应用根据本发明的所述转输技术。

分布式计算，通过在计算装置和系统之间进行交换，提供了计算机资源的共享和服务。这些资源和服务包括信息交换、文件的高速缓冲存储和磁盘存储。分布式计算利用网络连通性，允许客户补充（leverage）其集体的供电和存储量以使整个企业受益。关于这一点，许多装置都可以具有可能涉及了通过本发明无线地投影内容的应用程序、对象或资源。

图 2A 提供了一示例性网络或分布式计算环境的原理图。所述分布式计

算环境包括计算对象 10a、10b 等和计算对象或装置 110a、110b、110c 等。这些对象可以包含程序、方法、数据存储器、可编程逻辑等等。所述对象可以包含相同或不同的装置部分，诸如 PDA、音频/视频设备、MP3 播放器、个人电脑等等。每个对象都能够与别的对象经由通信网络 14 进行通信。所述网络本身可以包含其他向图 2A 的系统提供服务的计算对象和计算装置，并且其本身还可以表示多个相互连接的网络。根据本发明的一个方面，每个对象 10a、10b 等或 110a、110b、110c 等都可以包含一应用程序，其可以使用一接口，诸如 API、或其他对象、软件固件和/或硬件，来进行请求，或使用根据本发明的无线内容投影处理。

还可以知道，对象，诸如 110c，可以在别的计算装置 10a、10b 等、或 110a、110b 等上被处理。因此，虽然所画出的物理环境能够显示出所连接的装置是计算机，但是这种说明只是示例性的并且也可以把所述物理环境画成或描述成包括不同的诸如 PDA、电视、MP3 播放器等的数字装置、诸如接口、COM 对象这样的软件对象、或任一其使用与介质经验有关的装置。

有许多支持分布式计算环境的系统、元件、以及网络结构。诸如，可以通过有线或无线系统连起来的计算系统，其可以利用本地网络或广泛地分布式网络。目前，许多网络都被连至因特网，这就为广泛地分布式计算提供了基础设施并拥有了许多不同的网络。根据本发明，任何基础设施都可以用于无线内容投影设备所易发生的示例性通信。

在本地网络环境中，至少有 4 种完全不同的网络传输介质，其中每个都支持一种独特的协议，诸如输电线、数据（无线和有线两种）、语音（例如，电话）及娱乐介质。大多数家用控制装置，诸如照明开关以及电器可以利用输电线来连接。数据服务，可以随着宽带（例如，DSL 或电缆调制解调器）而进入家庭，并可利用无线（例如，HomeRF 或 802.11B）或有线（例如，Home PNA，Cat 5，以太网，甚至输电线）连接在家内对其进行访问。作为有线（例如，Cat 3）或者无线（例如，蜂窝电话）的电话业务可以进入家庭内部，并利用 Cat 3 线路分布在家庭内部。娱乐性介质，或其他图形数据，可以经由卫星或者电缆而进入家庭，并通常利用同轴电缆分布在家庭内。IEEE 1394 和 DVI 也是用于介质装置群集的数字互连。所有的这些网络环境以及其他可以作为协议标准出现的网络环境，都可以相互连接以形成一种网络，诸如内

部网，其可以经由因特网而与外界发生联系。简而言之，存在许多不同源用于数据的储存和发送，从而，前向移动，计算装置将需要共享数据的方法，诸如程序对象所容易访问或利用的数据，其需要或利用了根据本发明的无线内容发送装置。

所述因特网，一般指的是利用一套在计算机网络领域众所周知的协议TCP / IP的网络和网关的集合。TCP / IP是“Transmission Control Protocol / Internet Protocol”的缩写。所述因特网可以被说成是一种利用执行联网协议的计算机相互连接的、从地理上讲远距离地分布的计算机网络的系统，其中所述联网协议允许用户在网络上进行交互并共享信息。由于这种分布广泛的信息共享，诸如因特网这样的远程网络，到现在为止已经被逐渐地发展成了一种开放式的系统，开发者可以基本上不受限制地设计用于执行专门的操作或服务的软件应用程序。

因此，所述网络基础设施启用了大量的网络布局，诸如客户机/服务器、对等、或混合结构。所述“客户机”是一类或一组使用其他与其无关的类或组的服务的成员。因此，在计算中，客户机是一进程，即，一般说来是一组指令任务，其请求别的程序所提供的服务。所述客户机进程，不须“知道”其他程序或服务本身的工作细节，就可使用所请求的服务。在一客户机/服务器结构中，尤其是一网络系统中，客户机通常是访问别的计算机，例如服务器，所提供的共享网络资源的计算机。在图 2A 的例子中，计算机 110a、110b 等可以被看作是客户机，而计算机 10a、10b 等可以被看作是服务器，其中服务器 10a、10b 等持有之后被复制到客户机计算机 110a、110b 等中的数据，尽管根据环境，任一计算机都可以被考虑为客户机、服务器或两者均可。例如，计算机 110a 可以是膝上型电脑，计算装置 10a、10b 等可以是远程介质装置，或备用显示器装置。任何计算装置，都可以请求涉及内容的无线发送/接收的服务或任务或处理数据。

服务器，通常是可在远程或局部网络上，诸如因特网上，访问的远程计算机系统。所述客户机进程可以在第一计算机系统中有效而服务器进程可以在第二计算机系统中有效，它们在通信介质上相互通信，从而提供了分布式功能并允许多个客户机利用服务器的信息收集的性能。任何按照本发明所使用的软件对象，都可以分布于多个计算装置或对象上。

客户机和服务器利用协议层所提供的功能相互通信。例如，超文本传输协议（HTTP）是用于与万维网（WWW）或“网络”进行连接的公共协议。例如，远程桌面协议（RDP）是远程计算所用的公共协议。通常，诸如网际协议（IP）地址这样的计算机网络地址，或诸如通用资源定位符（URL）这样的其他坐标，可用于服务器或客户机计算机之间的互相识别。所述网络地址可以被称为 URL 地址。可以在通信介质上进行通信，例如，客户机和服务器可以通过用于大容量通信的 TCP / IP 连接而相互连接。

因此，图 2A 示出了一个可以使用本发明的示例性网络或分布式环境，其中服务器经由网络/总线与客户机计算机进行通信。更详细地，根据本发明，大量服务器 10a、10b 等，经由通信网络/总线 14，其可以是局域网（LAN）、广域网（WAN）、内部网、因特网等等，与大量客户机或远程计算装置 110a、110b、110c、110d、110e 等，诸如便携式计算机、手持式计算机、瘦客户机、联网电器、或其他装置，诸如录像机（VCR）、电视、烤箱、灯、加热器等等，相互连接。因此，可以预计，就储存、创建、用户界面、呈现等而论，本发明能够适用于任何具有介质能力的计算装置。

在通信网络/总线 14 是因特网的网络环境中，例如，服务器 10a、10b 等可以是网络服务器，其中客户机 110a、110b、110c、110d、110e 等经由已知的协议中的一种，诸如 HTTP，与该网络服务器进行通信。服务器 10a、10b 等，还可以用作客户机 110a、110b、110c、110d、110e 等，其为分布式计算环境的特征。

通信可以是有线或无线的，只要适用。客户机装置 110a、110b、110c、110d、110e 等，可以经由或可以不经由通信网络/总线 14 进行通信，并且可以具有与之相关的独立的通信。例如，在电视或录像机的情况下，可以有也可以没有对其控制的联网特征。每个客户机计算机 110a、110b、110c、110d、110e 等和服务器计算机 10a、10b 等都可以具有不同的应用程序模块或对象 135，并且可以与各种存储元件或对象进行连接或对其进行访问，其中文件或数据流可以存于所述存储元件或对象上或部分文件或数据流可以下载、传输或移动到其上。任意一个或多个计算机 10a、10b、110a、110b 等都可以负责维护或更新数据库 20 或其他存储元件，诸如存储根据本发明所处理的数据的数据库或存储器 20。因此，可以在下述计算机网络环境中使用本发明，



即,其具有能够访问或与计算机网路/总线 14 进行交互的客户机计算机 110a、110b 等,与客户机计算机 110a、110b 等进行交互的服务器计算机 10a、10b 等,以及其他类似装置和数据库 20。

#### 示例性计算装置

图 2B 以及下列论述,是用来对能够实施本发明的合适的计算环境的简要概述。然而,应该明白,各种手持式、便携式及其他计算装置和计算对象,都是为了与本发明相结合而被考虑的,即,无论在计算环境中的何处使用介质。当通用计算机作为示例性主机被如下描述时,其仅仅是个例子,本发明还可以用具有联网/总线互操作性和交互作用的瘦客户机实现。因此,本发明可以在只涉及了极少的或最小的客户机资源的联网主机服务的环境中实现,例如,联网环境,其中客户机装置只用作网络/总线的接口,诸如,置入电器中的对象。实质上,无论数据或内容可以被存于何处或从何处取回数据或被发送到别的计算机,都是可取的、或适合的用于根据本发明的内容的无线传输的操作的环境。

虽然不需要的,但是本发明仍可以通过一操作系统实现,以供用于装置或对象的服务的开发者使用,和/或包括在关于根据本发明的内容的无线传输而运行的应用软件中。在计算机可执行指令的通常情况下,软件可以被描述成,诸如程序模块,其由一个或多个计算机,诸如客户工作站、服务器或其他装置执行。通常,程序模块包括执行具体任务或实现具体抽象数据类型的例行程序、程序、对象、部件、数据结构等等。通常,可以按照在不同的实施例中的要求,对程序模块的功能进行组合或分布。而且,本领域技术人员将会明白,还可以用其他计算机系统结构和协议来实施本发明。其他众所周知的适于与本发明一起使用的计算系统、环境、和/或结构,包括但不限于个人电脑(PC)、自动柜员机、服务器计算机、手持式或膝上型装置、多处理器系统、基于微处理器的系统、可编程的用户电子设备、网络 PC、电器、灯、环境控制元件、小型机、主计算机等等。本发明还可以在分布式计算环境中实施,其中利用经由通信网络/总线或其他数据传输介质所连接的远程处理装置执行任务。在一分布式计算环境中,程序模块既可以位于本地的也可以位于远程的包括存储装置的计算机存储介质中,并且客户节点可以轮流充当服务器节点。

因此，图 2B 示出了可以实现本发明的合适的计算系统环境的一个例子，不过正如上所阐明的，计算系统环境 100 仅仅是合适的计算环境的一个例子而不是试图暗示是对本发明的功能或使用的范围的任何限制。也不应将计算环境 100 解释成，是对在示例性操作环境 100 中所示出的部件中的一个或其组合的依赖或必要条件。

参照图 2B，用于实施本发明的一示例性系统包括一通用计算装置，作为计算机 110。计算机 110 的部件可以包括，但不限于，一处理单元 120，一系统存储器 130、以及一个把包括所述系统存储器的各种系统部件连接到处理单元 120 的系统总线 121。系统总线 121 可以是下述几种类型的总线结构中的任一种，即，包括存储器总线或存储控制器、外围总线、以及利用各种总线体系结构中的任一种的局部总线。举例来说，而不是，而不是限制，这种体系结构包括工业标准结构（ISA）总线、微通道结构（MCA）总线、增强 ISA（EISA）总线、视频电子标准协会（VESA）局部总线、以及外围部件互连（PCI）总线（又名 Mezzanine 总线）。

计算机 110 通常包括各种计算机可读介质。计算机可读介质可以是任一可用介质，其可以被计算机 110 访问并包括易失以及非易失介质、可移动以及不可移动介质。举例来说，而不是模仿，计算机可读介质可以包括计算机储存介质以及通信介质。计算机储存介质，包括在任一方法或技术中所实施的用于诸如计算机可读指令、数据结构、程序模块或其他数据的信息存储的易失和非易失、可移动和不可移动的两种介质。计算机储存介质包括，而不是不局限于，RAM、ROM、EEPROM、闪存存储器或其他存储技术、CDROM、数字视频光盘（DVD）或其他光盘存储、磁带盒、磁带、磁盘存储器或其他磁存储器、或任一其他可用于存储想要的信息的并可以被计算机 110 访问的介质。通信介质通常包括计算机可读指令、数据结构、程序模块或其他在已调数据信号诸如载波或其他传送机构中的数据并包括任一信息传送介质。所述术语“已调数据信号”，指的是这样的一种信号，其具有一个或多个其特征集和以一种这样的方式改变以致对该信号中的信息进行编码。举例来说，而不是限制，通信介质包括有线介质诸如有线网络或直接用线的连接（direct-wired connection）、以及诸如声波（acoustic）、RF（射频）、红外及其他无线介质这样的无线介质。上述介质的任意组合都将包括在计算

机可读介质的范围内。

系统存储器 130 包括计算机存储介质，作为易失和/或非易失存储器，诸如只读存储器 (ROM) 131 和随机存取存储器 (RAM) 132。基本输入/输出系统 133 (BIOS)，含有有助于诸如在启动期间在计算机 110 内部的元件之间传输信息的基本例行程序，其通常存于 ROM 131 中。RAM 132 通常含有数据和/或程序模块，其可被处理单元 120 直接访问和/或由其运行。举例来说，而不是限制，图 2B 示出了操作系统 134、应用程序 135、其他程序模块 136、以及程序数据 137。

计算机 110 还可以包括其他可移动/不可移动、易失/非易失计算机存储介质。仅举例来说，图 2B 示出了对不可移动、非易失磁介质进行读或写的硬盘驱动器 141，对可移动、非易失磁盘 152 进行读或写的磁盘驱动 151、对可移动、非易失光盘 156 进行读或写的光盘驱动器 155，诸如 CD-ROM 或其他光学介质。可被用于示例性的操作环境的其他可移动/不可移动、易失/非易失计算机存储介质，包括但不限于，盒式磁带、闪速存储卡、数字视频光盘、数字视频带子、固态 RAM、固态 ROM 等等。硬盘驱动器 141，通常经由不可移动存储器接口，诸如接口 140，连接到系统总线 121，以及磁盘驱动器 151 和光盘驱动器 155 通常通过可移动存储器接口，诸如接口 150，连接到系统总线 121。

在图 2B 中所示出的并在上面讨论过的所述驱动器以及与其相连的计算机存储介质，提供了计算机可读指令、数据结构、程序模块及其他用于计算机 110 的数据的存储器。例如，在图 2B 中，示出了硬盘驱动器 141，用于存储操作系统 144、应用程序 145、其他程序模块 146 以及程序数据 147。应该注意到，这些部件既可以相同于也可以不同于操作系统 134、应用程序 135、其他程序模块 136 以及程序数据 137。在这里，对操作系统 144、应用程序 145、其他程序模块 146 以及程序数据 147 给出了不同的编号，以说明至少他们是不同的。用户可以把命令和信息，经由下述输入装置输入到计算机 110，诸如键盘 162 以及指示器 161，一般叫作鼠标、跟踪球或触模板。这些及其他输入装置，常常通过连接到系统总线 121 的用户输入接口 160 连接到处理单元 120，不过还可以利用其他接口和总线结构，诸如并行端口、游戏端口或通用串行总线 (USB) 进行连接。图形接口 182，诸如北桥

(Northbridge)，还可以连接到系统总线 121。北桥是与 CPU、主处理单元 120 进行通信的芯片组，并承担促进图形端口 (AGP) 的通信的责任。一个和多个图形处理单元 (GPU) 184 可以与图形接口 182 进行通信。在这方面，GPU 184 通常包括单片存储器，诸如与视频存储器 186 进行通信的 GPU 184 和寄存器存储器，其中已经加入了本发明的应用程序变量。然而，GPU184，只不过是协处理器的一个例子，因此各种协同处理装置都可以被包括进计算机 110 中，并可以包括各种程序着色器，诸如像素和顶点着色器。监视器 191 或其他类型显示装置也经由一种接口，诸如可以按顺序与视频存储器 186 进行通信的视频接口 190，连接到系统总线 121。除监视器 191 之外，计算机还可以包括其他外围输出设备，诸如扬声器 197 和打印机 196，其可以通过输出外围设备接口 195 来连接。[0042] 计算机 110 可以利用到一个和多个远程计算机的逻辑连接，诸如到远程计算机 180 的逻辑连接，在网络或分布式环境中运行。远程计算机 180 可以是个人电脑、服务器、路由器、网络 PC、同等装置或其他公用网络节点，并且通常包括许多或全部关于计算机 110 而在上面描述的元件，尽管只在图 2B 中示出了一个存储装置 181。在图 2B 中所描述的逻辑连接包括一个局域网 (LAN) 171 和一个广域网 (WAN) 173，但是还可以包括其他网络/总线。在家里、行政机关、企业范围的计算机网络、内部网和因特网中，这种联网环境是很平常的。

当用于 LAN 联网环境时，计算机 110 通过网络接口或适配器 170 连接到 LAN 171。当用于 WAN 联网环境时，计算机 110 通常包括调制解调器 172 或其他用于建立在诸如因特网这样的 WAN 173 上的通信的装置。调制解调器 172，其可以是内部的或外部的，可以经由用户输入接口 160、或其他合适的装置连接到系统总线 121。在网络环境中，关于计算机 110 所描述的程序模块、或其一部分，可以存于远程存储器装置中。举例来说，而不是限制，图 2B 示出了驻留在存储器件 181 上的远程应用程序 185。应该明白，所示出的网络连接是示例性的并且可以使用其他在计算机之间建立通信链路的装置。

#### 示例性的备用装置

如所提到的，本发明适用于任一装置，其中把内容从一个计算装置无线地投影到另一计算装置的显示器上。图 2C 以及下列讨论试图补充对图 2B



的概述。由此，应该明白，各种手持式、便携式及其他计算装置和计算对象打算结合本发明来使用，即，无论装置可能想要无线地把内容传递到何处的备用显示器上。因此，如下所述的下列通用远程计算机仅仅是一个例子，本发明可以用任一具有网络/总线和交互作用的客户机实现。因此，本发明可以在只涉及了极少的或最小的客户机资源的联网主机服务的环境中实现，例如，联网环境，其中客户机装置只用作网络/总线的接口，诸如，置入电器中的对象。

虽然不是必需的，但是本发明仍可以通过一操作系统来在一定程度上得以实现，以供用于装置或对象的服务的开发者使用，和/或包括在结合本发明的部件运行的应用软件中。在计算机可执行指令的通常情况下，软件可以被描述成，诸如程序模块，其由一个或多个计算机，诸如客户工作站、服务器或其他装置执行。而且，本领域技术人员将会明白，还可以用其他计算机系统结构和协议来实施本发明。

因此，图 2C 示出了可以实现本发明的合适的计算系统环境 100a 的一个例子，不过正如上所阐明的，计算系统环境 100a 仅仅是用于介质装置的合适的计算环境的一个例子而不是试图暗示是对本发明的功能或使用的范围的任何限制。也不应将计算环境 100a 解释成，是对在示例性操作环境 100a 中所示出的部件中的一个或其组合的依赖或必要条件。

参照图 2C，用于实现本发明的一个示例性远程设备包括一通用计算装置，作为计算机 110a。计算机 110a 的部件包括，但不局限于，处理部件 120a、系统存储器 130a、和把包括系统存储器在内的各种系统部件连接到处理部件 120a 的系统总线 121a。系统总线 121a 可以是下述几种类型总线结构中的任一种类型，即包括存储器总线或存储控制器、外围总线、和利用各种总线体系结构种的任一种的局部总线。

计算机 110a 通常包括各种计算机可读介质。计算机可读介质可以是任一可以被计算机 110a 访问的可用的介质。例如，而不是限制，计算机可读介质可以包括计算机外部存储器介质和通信介质。计算机外部存储器介质包括易失和非易失的、可移动和不可移动两种介质，其在任一方法或技术中实施，用于诸如计算机可读指令、数据结构、程序模块或其他数据这样的信息存储。计算机外部存储介质包括，但不局限于，RAM、ROM、EEPROM、闪

速存储器或其他存储技术、CDROM、数字视频光盘(DVD)或其他光盘存储器、磁带盒、磁带、磁盘存储器或其他磁存储器、或任一其他可用于储存想要的信息并且能被计算机110访问的介质。通信介质通常包括有计算机可读指令、数据结构、程序模块或其他在诸如载波或其他传送机构中的已调数据信号中的数据以及包括任一信息传输介质。

系统存储器130a可以包括计算机存储介质,作为易失和/或非易失存储器,诸如只读存储器(ROM)和/或随机存取存储器(RAM)。基本输入/输出系统(BIOS),含有诸如在启动期间促进在计算机110内部元件之间传输信息的基本例行程序,其可以存于存储器130a中。存储器130a通常还包含数据和/或程序模块,其能直接被处理部件120a访问和/或立刻由其运行。举例来说,而不是限制,存储器还可以包括操作系统、应用程序、其他程序模块、和程序数据。

计算机110a还可以包括其他可移动/不可移动的、易失/非易失的计算机存储介质。例如,计算机110a可以包括,对不可移动的非易失的磁性介质进行读或写的硬盘驱动器、对可移动非易失的磁盘进行读或写的磁盘驱动、和/或对诸如CD-ROM或其他光学介质这样的可移动非易失的光盘进行读或写的光盘驱动器。其他可被用于示例性操作环境中的可移动/不可移动的、易失/非易失的计算机存储介质包括,但不局限于,盒式磁带、快擦写存储卡、数字视频光盘、数字视频带子、固态RAM、固态ROM等等。硬盘驱动器通常经由不可移动的存储接口,诸如一个接口,连接到系统总线121a,而磁盘驱动器或光盘驱动器通常利用可移动存储器接口,诸如一个接口,连接到系统总线121。

用户可以把命令和信息经由下述输入装置输入计算机110a,诸如键盘和指示器,一般称为鼠标、跟踪球或触摸垫。其他输入装置可以包括麦克风、操纵杆、游戏垫、圆盘式卫星电视天线、扫描仪等等。这些及其他输入装置往往经由用户输入140a和连接到系统总线121a的相连的接口连接到处理部件120a,但是还可以利用其他接口和总线结构,诸如并行端口、游戏端口或通用串行总线(USB)进行连接。图形辅助系统还可以连接到系统总线121a。监视器或其他种显示设备也通过一个接口,诸如可以依次与视频存储器进行通信的输出接口150a,连接到系统总线121a。除监视器之外,计

算机还可以包括其他外围输出设备，诸如扬声器和打印机，其可以通过输出接口 150a 进行连接。

计算机 110a，可以利用到一个或多个可以依次具有不同于装置 110a 的介质性能的其他远程计算机的逻辑连接，诸如到远程计算机 170a，而在联网或分布式环境中运行。远程计算机 170a 可以是个人电脑、服务器、路由器、联网 PC、同等装置或其他公用网络节点、或任一其他远程介质消耗（consumption）或传输装置，并且可以包括任一或全部在上面所描述的关于计算机 110a 的元件。在图 2C 中所画出的逻辑连接包括网络 171a、上述的局域网（LAN）或广域网（WAN），但是还可以包括其他网络/总线。上述的联网环境在家里、机关、企业范围计算机网络、内部网以及因特网内都是常见的。

当用于局域网联网环境时，计算机 110a 通过网络接口或适配器连接到 LAN 171a。当用于 WAN 联网环境时，计算机 110a 通常包括调制解调器或其他装置，用于在诸如因特网这样的 WAN 上建立通信联系。调制解调器，可以是内部的或外部的，其可以通过输入 140a 的用户输入接口或其他合适的机构连接到系统总线 121a。在一联网环境中，关于计算机 110a 所描绘的程序模块，或其一部分，可以存于远程存储装置。将意识到，所示出的和描述的网络连接是示例性的并且还可以使用在计算机之间建立通信链路的其他装置。

#### 示例性分布式计算的框架或结构

考虑到个人计算和因特网的收敛性，已经和正在研发各种分布式计算框架。单个的和相似的商业用户具有无缝可互操作的和可用网页（Web-enabled）的界面，用于应用程序和计算装置，使计算活动逐渐面向浏览器或网络。

例如，微软版权所有的管理代码（managed code）平台，即，.NET，包括服务器、构件块服务、诸如基于网页的数据存储和可下载软件。一般说来，.NET 平台提供了（1）使全部计算装置一起工作并使它们上的用户信息都自动地进行更新和同步，（2）用于网页的提高了的交互性能，通过更多地使用 XML 而不是 HTML 来做到这一点，（3）特征定制访问的联机服务，和从一个中央起点到所述用户的产品和服务的传送，用于各种应用程序的管理，例如，

像电子邮件，或者像 Office .NET 这样的软件，(4)集中的数据储存，其提高了对信息的访问的效率和便利性，用户和装置之间的信息的同步，(5)具有集成像电子邮件、传真、和电话这样的各种传播介质的能力，(6)对于开发者来说，具有产生可重用模块的能力，由此提高了生产率并降低了程序设计错误的数目和(7)还有许多其他跨平台和语言的集成特征。

当在此处结合驻留在一计算装置上的软件来对某一示例性具体实施例进行描述时，本发明的一个或多个部分还可以通过一操作系统、应用编程接口(API)或“中间人(middle man)”对象、控制对象、硬件、固件、中间语言指令或对象等等来实施，以便本发明的方法可以包括在管理代码中，得到管理代码的支持或访问借助于管理代码所使用的全部语言和服务，诸如.NET 代码，和也在其他分布式计算框架中。

#### 远程桌面协议和终端服务器对话概述

微软远程桌面协议(RDP)是协议的一个例子，其可用于把介质记录从主机导入到远程介质消耗装置。RDP 提供了在用于在一服务器上运行的基于 windows 的应用程序的网络连接上面远程显示和输入的性能。RDP 被设计成支持不同类型的网络布局 and 多种局域网协议。

在服务器上，通过利用协议把提供信息构造成网络消息包并通过网络把他们发送到客户机，RDP 利用其自己的视频驱动器来提供显示器输出。在客户机上，RDP 接收提供数据并把所述消息包解释成相应的图形设备接口 API 调用。对于输入路径来说，客户机的鼠标和键盘事件被重定向为从客户机到所述服务器。在所述服务器上，RDP 利用其自己的虚拟键盘和鼠标驱动器来接收键盘和鼠标事件。从一非限制特征观点来看，RDP 包括加密、带宽压缩特征、漫游断开(roaming disconnect)、剪贴板映射(clipboard mapping)、打印重定向、虚拟信道、遥控和网络负荷平衡(network load balancing)。

终端服务器提供了一种示例性的远程计算环境作为服务器的扩展，诸如 Windows NT 服务器。只用瘦客户机，用户就可以体验完全脱离服务器的服务器桌面操作系统和应用程序。利用终端服务器，提供给用户从任何下列类型的桌面到基于 windows 的应用程序的访问：(A) 低价硬件，一般称为基于 windows 的终端机，其通过第三方的硬件供应商而在市场上进行买卖。(B) Windows 桌面操作系统，诸如 Windows 95 或 Microsoft Windows NT



Workstation, 通过运行 Terminal Server (终端服务器) 客户机作为本地桌面环境内的视窗, 以及 (C) 基于 X 的终端、基于 UNIX 的桌面和苹果计算机 (Apple Macintosh), MS - DOS 及其他网络计算机 (通过附加软件)。

终端服务器包括三个主要部件: 终端服务器多用户核心、远程桌面协议 (RDP) 以及瘦客户机软件。

终端服务器是多用户服务器核心, 其提供了处理多个在其他装置上同时发生的客户机对话的能力。终端服务器, 能够直接处理在各种基于 windows 的和非基于 windows 的硬件上运行的可兼容的多用户客户机桌面。标准的基于 windows 的应用程序不需修改就可在终端服务器上运行, 以及所有标准的基于 Windows NT 的管理基础设施和技术可用于管理客户机桌面。用这种方法, 公司可以利用对窗口环境所提供的应用程序和工具的各种选择。

RDP 是终端服务器的协议, 其允许瘦客户机与终端服务器在网络上进行通信。该协议基于国际电信联盟 (ITU) T. 120 协议、国际标准多信道会议协议。为高带宽企业环境调整 RDP 并且 RDP 还支持加密对话。

所述瘦客户机部件, 是在包括基于 windows 的终端装置和个人电脑的桌面硬件范围内提供或显示 Windows 用户界面的软件。

终端服务器的对象管理器, 具有不冲突的不同的对话应用程序和系统程序。在对话内所创建的每一个对象的, 都被附加了一个与创建它的单个对话有关的唯一标识符编号 (SessionID, 对话 ID)。所述终端服务器服务是完全独立的协议, 因此其可以利用 RDP 或第三方附加协议, 诸如 Citrix 的 ICA, 来运行。

RDP 是一种多信道协议 (multichannel capable protocol), 其允许独立的虚拟信道从服务器传送串行设备通信和描述数据 (presentation data)、以及加密的客户机鼠标和键盘数据。虚拟信道是软件扩展 (software extension), 其可用于把有用的改进添加到终端服务应用程序 (Terminal Services) 上。有用的改进的例子可以包括: 支持特定类型的硬件、音频、或其他由终端服务 RDP 所提供的对核心功能的添加。RDP 提供了对多虚拟信道的多路管理。

虚拟信道应用程序具有二个部分, 客户机端部件和服务端部件。服务端部件是一种运行在终端服务器上的可执行程序。客户端部件, 是当终

端服务客户机程序运行时，载入到客户计算机上的存储器中的 DLL（动态链接库）。

虚拟信道可以把有用的改进添加到与 RDP 协议无关的终端服务客户机上。利用虚拟信道的支持，可以添加新特征而不必更新客户或服务器软件，或 RDP 协议。

其他几种性能也是部分 T.120 标准定义，包括，例如，多点数据传送，其允许数据从一应用程序实时地传送到多方。启用组播传送，允许了数据传输的可靠的传送服务。其为用户提高了性能，但是同时也减少了网络基础设施上的负载。RDP 对连通性目的有好处，因为其提供了一个可扩展基础，通过该基础来逐步增加更多的性能。这是部分地由于 RDP 提供了高达 4,000 个用于数据传输的独立的信道、和用于多点传输的设备。

RDP，被设计成支持许多不同类型的网络布局，诸如 ISDN、POTS，和许多局域网协议，诸如 IPX、Netbios、TCP / IP 等等。

涉及了通过 RDP 堆栈（stack）发送和接收数据的活动，基本上与当今用于普通 LAN 联网的七层 OSI（开放系统互连）模型标准相同。所要传输的来自应用程序或服务的数据，经由协议堆栈向下传递，被在网络协议上分段（sectioned）、送往信道，加密，封装、装配，打包，并且最后被寻址和经由电线发送到客户机。

返回数据，以相反的方式工作，信息包被剥掉地址、然后打开、解密等等，直到把数据提供给所述应用程序以供使用。在第 4 和第 7 层之间发生了一些部分协议堆栈修改，其中数据被加密、封装、和装配、送往信道，以及按优先次序排列。

利用 RDP，有利地，处理协议堆栈的复杂性被从应用程序开发者处抽离。应用程序开发者简单地编写所述应用程序，并且终端服务器所实施的 RDP 堆栈及其客户机连接注意到了其余部分。

当开始时，终端服务器引导并装入核心操作系统，并且启动终端服务器服务以及开始等待对话连接。每个连接都给出了一个唯一的对话标识符或“SessionID（对话 ID）”以向终端服务器提供一个专用的对话，并且在对话内所创建的每个进程都被“加上标签（tagged）”，相关联的 SessionID，以对其域名空间和其他对话域名空间进行区别。当用户登录到启用终端服

务的计算机上时,就为用户启动一个对话,并利用唯一的对话 ID 来识别。由于每次登录到终端服务客户机上都收到一个独立的对话 ID,所以用户在感觉上类似于同时登录到多个计算机上,例如,办公计算机和家用计算机。

所述控制台(终端服务器键盘,鼠标,和图像)对话最先载入并被看作一个特定情况客户机连接和指定的对话 ID。所述控制台对话作为普通系统对话启动,同时载入所配置的显示器、鼠标、和键盘驱动程序。

在创建控制台对话之后,接着所述终端服务器服务程序调用对话管理程序以创建两个(默认)等候客户机连接的空闲客户机对话。为创建空闲对话,对话管理程序执行客户机服务器运行时间辅助系统进程并且一个新的 SessionID 被分配给该进程。

不象控制台对话,客户机对话被配置成载入独立的用于显示器、键盘和鼠标的驱动程序。新的显示器驱动程序是远程桌面协议(RDP)显示设备驱动程序,并且鼠标和键盘驱动程序被 RDP 驱动程序取代。这些驱动程序允许 RDP 客户机对话是远程地可用的且交互的。最后,终端服务器还调用一个用于 RDP 协议的连接监听程序线程,其监听 TCP 端口上的 RDP 客户机连接。防止带有不同 SessionID 的进程访问别的对话数据。

在一示例性的实施中,客户机启动一个经由 TCP 端口到终端服务器的连接。所述终端服务器 RDP 监听程序线程检测所述对话请求并创建一个新的 RDP 堆栈实例以处理该新的对话请求。监听程序线程,把输入的对话转交给新的 RDP 堆栈实例,并在 TCP 端口上继续监听其他连接尝试。每个 RDP 堆栈,都作为所连接的以处理对话结构细节的协商的客户机对话,而被创建。

在用户登录之后,如果在单一应用程序模式中,则向用户显示所述桌面、或应用程序。当用户选定了一个应用程序以运行时,鼠标命令被传递到新的虚拟内存空间。

如果用户决定断开所述对话,则所述处理和所有的虚拟内存空间都搁置,并且如果其他处理需要物理存储器则被翻离该物理磁盘。RDP 的一个额外的好处是,能根据用户对所述对话的要求来改变对话屏幕分辨率。例如,如果用户以前已经以 800×600 的分辨率连接到终端服务器对话并断开,然后移到只支持 640×480 分辨率的不同的计算机处,并重新连接到已有对话,则将重绘桌面以支持新的分辨率。

实施注销通常很简单。一旦用户从对话注销，则所有与 SessionID 有关的处理都被终止，并释放分配给所述对话的所有的存储器。

#### 用于无线地发送和接收内容的系统和方法

一方面，所述发明使显示装置，诸如投影仪或大型显示监视器，包括了无线技术，其允许显示装置从移动计算装置接收内容/数据。因此，用户不必物理地把移动装置连接到电缆上。另一方面，将被从移动装置发送给显示装置的内容/数据，还可以被同时地在会议参加者的计算装置上观看。无线技术正在迅速地聚集了投影仪市场上的动向。利用所制造的带有无线功能的投影仪，诸如 Wi-Fi，在“ad-hoc”模式中，投影仪允许移动用户容易地进行访问以提供内容。这种投影仪提供了把多个移动用户集合到同一房间或对于无线技术来说足够近的房间内的能力，以用于合作会议。另外，本发明提供了一种容易的连接，其中有线解决方案并不是实际的，即，消除了架线问题。

因此，利用本发明，投影仪安装起来比较容易，整理者也比较容易，并且在有效距离内没有信号损失或降低。利用本发明，在多个 PC 源之间转换也是还比较容易的，例如，如果有多个人通过他们自己的膝上计算机出席。因此，报告者可以在室内可以在室内更加灵活，或者相反在无线技术的能力范围之内，他们不必在投影仪附近或在墙上插座附近。在本发明的一个实施例中，通过包括无线技术，诸如 Wi-Fi，其能够投影到移动装置的操作系统中的投影仪或其他移动装置，所述移动装置能够无线地进行投影而不需要额外安装软件或硬件到移动装置上。

在一个实施例中，本发明支持嵌入到投影仪中的无线技术，并利用即插即用标准 (UPnP) 来通知投影仪的出现、用户便携式/移动式计算机，以发现并控制所述投影仪。本发明能够利用终端服务对话把显示连接到所述用户机器上。

本发明简化了在便携式/移动式计算机驱动其他便携式/移动式计算机的投影仪和显示之间的综合技巧。在投影仪上增加无线功能，这就允许了移动用户能够容易地进行访问，并提供了把大量移动用户集合到用于合作会议的同一房间中的能力，以及提供了一个并没有实际的有线解决方案的容易的连接。由于消除了架线问题，所以投影仪的安装比较容易，整理也比较



容易，并且在较长的距离内没有信号损失。在多个 PC 源之间进行转换更加容易，尤其是如果多个人通过其自己的膝上计算机而出席时，并且报告者在室内能够更加灵活——他们不必在投影仪旁边或在墙上插座旁边。

根据本发明的无线技术中的一个主要的好处是，能够在一个有多个报告者的房间内体现出来，其中每个发言人都必须事先把他们的膝上计算机插入投影仪接头并且在用完时拔出，即，通过本发明，能够实现合作组报告而不需转换电缆。本发明所实现的三种情形包括 Mirror、Extended Monitor 和 1：N。 在一个示例性 Mirror 情形中，梅利莎走进会议室并把她的膝上计算机设置为会议模式。 她的机器发现了会议室内的投影仪。 她按在投影仪上的样子来无线地投影在其膝上计算机上的幻灯片放映。 在她完成了她的幻灯片的显示以后，由于其他会议参加者要使用该投影仪，她就从所述投影仪上断开。 在这里给出了许多例子，它们都不应被看作是对本发明的限制。 例如，在 1：1 或 1：n 投影环境中的任一种中，都能实现 Extended 情形。 所述 Mirror 情形也可以在 1：1 和 1：n 投影环境中实现，即，他们不是全部的情形。

在一个典型的 Extended Monitor 情形中，帕特里克在进入客户会议室时把他的膝上计算机设置为会议模式。 他的机器在室内发现了无线投影仪。 通过使所述投影仪能够用于伸展多监视器方式，投影仪投影所述报告，同时帕特里克的膝上计算机示出他的注释。 实际上，帕特里克的显示是分开的因此其能被用作第二监视器。

在一个典型的 1：N 情形中，佛瑞德在机场大厅遇见了他的同事，他们都有膝上计算机，或其他计算装置，其包括根据本发明的软件，例如，所述操作系统中，或作为一个应用程序。 从而，佛瑞德能够容易地把他的幻灯片投影在他所有同事的膝上计算机上，和/或一个投影仪上，如果有一个可用的话。

因此，本发明的解决方案提供了一个简单的用户界面（UI），其允许用户发现可用的无线投影仪或其他计算机，进行设置并且连至其上。 此外，本发明包括一个用于其他计算机用户 UI，以接受来自源便携式/移动式计算机的“投影”内容/数据。

图 3 示出了一个示例性顺序，用于根据本发明运行一个无线投影应用程

序。例如，在 300，一个用于投影的示例性用户交互从例示本发明的软件功能开始。这可以发生在所述装置的开始阶段，或作为一个投影请求的一部分。对于一个非限制性例子来说，用户能够通过一个在启动菜单下面的菜单单元或顶层或容易到达的 UI，诸如工具条来开始本发明。在 310，所述用户把机器设置到“报告”模式。报告模式能够影响其他在报告期间操作系统所调用的任务，例如，关掉通知，关掉屏幕空白，防止来自其它来源的音频，改变供电方案，改变桌面背景等。在一个非限制性的而不是图 3 所示出的具体实施例中，如果顶层或容易到的 UI 可用，并且发现了一个或多个显示，就会出现一个显示条。要让这发生，在已经选定了报告模式之后，所述机器可以处于例如 30 秒这样的预定时间的发现模式中，以便给本发明时间以便发现用于投影的显示器的存在。在 320，如果用户想要投影内容，则通过 UI 对用户进行询问。如果为“是”，则所述机器在 330 进入发现状态。如果为否，则所述软件退出或返回步骤 300，或 310。在 340，出现一个带有一显示器列表的对话框，例如，投影仪。在一个实施例中，对于其他膝上计算机，所述报告者并不接收膝上计算机显示器列表，而是创建一个带有会议名称/密码虚拟会议，以便其他人利用这些加入会议。在 350，所述用户选择一个显示器，例如，显示内容的投影仪。在一个实施例中，相对于其他膝上计算机，如上，用户并不选择其他膝上计算机，而是创建一个带有会议名称/密码的虚拟会议，以便其他人使用。在没有任何用户干预的背景下，也可能发现。

虽然发现进程可以返回所有的投影仪和膝上计算机，但是有些可能不能用于显示，即，目前别的投影正在使用。根据本发明，这些包括一个其正在被使用的标记，例如，在显示器上用“忙”图标把这些变灰。作为所述对话框的一部分，用户能够从最近使用的 (MRU) 投影仪列表中进行选择或直接输入投影仪名称，其可以包括指定一个 URL 或 IP 地址，而不需发现所述投影仪。也把选项给了所述用户以配置所述投影。

一旦备用显示器，例如，投影仪，已经选定，就可以开始投影。如果可用，则 UI 元件，例如，顶层部分或容易到达的 UI，诸如工具条，就允许用户：断开和/或添加更多的人到所述投影中。例如，在一个实施例中，顶层的弹出部分或容易到达的 UI，诸如，工具条，允许用户查看谁在报告中，并

可能断开与他们的连接，而不是添加更多的。在此实施例中，如果用户想要被加入其中，则用户通过会议名称/密码来选定一个报告以加入。由此一个对话框，例如显示工具条，显示投影状态、断开的的能力并添加更多的人到投影列表。

在图 4A 和 4B 中给出了本发明的结构。根据本发明的会议室投影仪技术结合了两种关键技术：UPnP 和 Terminal Services（终端服务）。通过使用根据本发明的这两种技术，允许用户发现和远程控制一个投影仪，投影一个（桌面、PowerPoint 等）以及把桌面扩展到分开的显示设备。图 4A 以及 4B 给出了根据本发明的会议室多监视（meeting room multimon）服务（MRM）的整个体系结构。最底层是操作系统，在该层上逐步增加了通用即插即用标准部件 UPnP 和终端服务 TS1 及 TS2 和远程辅助设备 RA1 及 RA2 部件。MRM 利用了两种技术来解决本发明所要解决的问题。通用即插即用标准用来发现和控制所述投影仪装置。终端服务和远程辅助设备用于所述显示的呈现。

图 4A 和 4B 也出示了本发明是如何包括两个部分的：一部分被使用或控制（MRM 发送器），而另一个实际上被用来显示发送器的屏幕。

所述发送器（图 4A）通过服务 SS 提供功能，控制并发现所述装置。它利用通用即插即用标准所定义的机制来完成此功能。此外，所述发送器包括终端服务服务器 TS1。通过该服务器，所述发送器的屏幕信息被分发给终端服务客户机 TS2，即，备用显示器装置。

图 4A 的控制点发现、控制、并投影到图 4B 的所述会议室投影仪装置，其可以包括膝上计算机、投影仪、监视器等。会议室投影仪装置利用通用即插即用标准来在网络上公布其自己。其利用了终端服务客户机 TS2“连接”到图 4A 的控制点中的终端服务服务器 TS1。接着，其接收来自终端服务服务器 TS1 的描述所述屏幕的信息。

图 5 示出了一个关于连至一个备用显示器装置上的所述进程的示例性流程图。在 500，所述控制点（或 MRM）发现了备用显示器装置。这可以通过下述步骤实现：1）发出对具体装置的一个通用即插即用搜索，在该情况下，该类型的所有装置都对该请求进行响应，或 2）监听公布其自己的装好自。一旦所述控制点知道了该具体装置，它就在 510 下载该装置的服务文件。

然后，所述发送器和装置彼此建立一个连接。在 520，通过在远程辅助

设备层调用合适的 API，生成一个“票 (ticket)”，用于终端服务客户机。所述票给出了关于如何连至所述发送器的信息，以及连入模式（投影、扩展、桌面、显示—专用应用程序等）。然后，在 530，用所述票调用所述装置的 UPnP 投影仪服务的 (ProjectorService) DS。换句话说，所述发送器把该票发送到所述装置。所述装置则在 540 把该票传递到在 OS2 上的远程辅助设备层或其他接收器。在 550 所述票被解码并交给终端服务客户机 TS2。在 560，所述终端服务客户机 TS2 连至服务器 TS1 并建立连接。在 570，该发送器的屏幕数据被通过 RDP 呈现给所述装置。

图 6 示出了一个关于控制备用显示器装置的进程的示例性流程图。一旦在 600 用户连至所述备用显示器装置，则在 610 所述备用显示器装置返回一个“SessionToken”，来识别专用连接。在某段时间的给定点，单个人“拥有”备用显示器装置。换句话说起初只有一个人告知所述备用显示器装置要投影什么连接。此外，该标记 (token) 用于备用显示器装置。利用该标记，用户能够：在 620 断开，在 630 为他们的对话改变/检索所述显示设置，在 640 转让所有权和/或“中断”他们的连接 650。

为一个 1:1 投影，所述投影仪控制点利用一个 API，诸如 SALEM 层 API，产生建立连接的票。至于一个投影及其他扩展的监视器投影，在一个实施例中，所述投影仪利用一个来自终端服务层的通信和合作 API，允许多个客户机参加一个多影像 (multi-shadowing) 对话。所述 API 也提供了一种邀请和不邀请客户参加影像对话的方法。用户控制点的目的，是显示可用的备用显示器装置列表，通过该列表用户能够对连接进行选择。

如上所述，本发明提供了在一种无线环境中发现会议室投影仪的能力，把膝上计算机显示投影在投影仪 (mirror 1:1) 上的能力，把膝上计算机显示投影在投影仪上和/或会议参加者 (1:m)，甚至在没有基于投影仪的 WinCE 的情况下，以及在膝上计算机上具有发言人的笔记和在投影仪上有幻灯片放映 (扩展的 multi-mon)。如所提到的，本发明还提供了便于用户对投影进行交互的用户界面，现在将更详细地描述关于用户界面装置方面的内容。

根据本发明，用户有配置投影仪的选择。根据本发明，一种布局的 UI 能够从对话框上的“选项”按钮开始，其允许该用户进行下述行为：设置投影密码，选择与扩展模式相对的复制模式 (cloning mode)，选择屏幕分辨



率和选择视频，或音频与视频。在一个实施例中，系统默认的克隆模式、屏幕分辨率默认当前系统环境一个以及把“音频和视频”选为默认的。

一方面，本发明的用户界面使用户能够表示其是否想要“投影”或“允许其他人投影”到其膝上计算机。如果所述用户选择“允许其他人投影”，则该机器就进入“可被发现”状态，即，该机器开始广播它的有效性，以便寻找可用的备用显示器装置的主机接收该机器是可用的的指示。做为选择，如果用户从想要提供给他/她的膝上计算机的某人处收到一通知，则对该用户进行询问。如果选择“是”，并且所述投影受密码保护，则要求该用户进入所述密码。

一旦已经开始了所述投影，则出现显示所述投影的客户投影窗口。在一个实施例中，所述窗口包括两个输入元件(例如，按钮)——一个用来断开连接，而另一个用来进行配置。配置允许用户关掉音频或让别人发现显示器，使发送器发现其他可能的用于所述内容的接收器。利用所述断开按钮，结束当前投影对话并取消所述投影窗口。在一个非限制性具体实施例中，没有告知报告者哪个用户正在观看所述投影。在另一非限制性具体实施例中，在投影期间所述指针变成一激光红点，以给报告者一种容易的方法来高亮度显示投影上的项目。

图 7A - 7H 示出了根据本发明的各种用户界面情形的示例性的非限制性的屏幕快照。图 7A 示出了一个根据本发明要投影到备用显示器装置上的示例性屏幕 700a。图 7B 示出了一个示例性屏幕快照 700b，其中询问用户是否参加会议，作为发送器或者接收器。图 7C 示出了一个示例性屏幕快照 700c，其中用户从一个列表中选择备用显示器装置。图 7D 示出了一个示例性屏幕快照 700d，其中提供给用户附加的显示器选项。图 7E 示出了一个示例性屏幕快照 700e，其给出了一个投影仪条部分弹出的情形，如果顶层或容易到达的 UI，诸如工具条，是可用的话。图 7F 示出了一个示例性屏幕快照 700f，其示出了备用显示器装置上的投影视图，其中所述指针装置已经变成一个激光点。图 7G 示出了一个示例性屏幕快照 700g，其中报告者邀请一个会议参加者参加会议。图 7H 示出了一个示例性屏幕快照 700h，其中所述用户接收并开始接收一个用于呈现所述投影内容的投影窗口。

当所述服务被配置成允许所述用户投影到一显示器上时，该服务可用于

发现已登记的 UPnP 投影仪装置，查询他们的当前状态，创建一个 TS 票以建立一个连接和从一对话断开。

MRM 不必与 TS 连接。 在一个实施例中，通过 UPnP API (UPnP 应用编程接口) 来建立连接。 断开并控制所述远程显示，利用了所述连接调用返回的对话标记。 简单地获得状态信息，不需要使用任一关于投影仪的对话数据 (例如投影仪状态，分辨率等)。

另外，所陈列的 UI 返回在现行设备环境 (例如，DPI，分辨率) 下的显示。 从而，在 DPI 和分辨率不同的机器间保持尺寸的一致。 以下述方式提供 UI，以使用户不必处理前景和画像定位中的任一窗口管理问题。 因此，在各种实施例中，所投影的屏幕都适于所述装置的长宽比。

下列是一根据本发明用来支持投影情形的方法的示例性非限制性的子集。

(1) Connect ([in] BSTR bstrTicket, [in] BSTR bstrUser, [out, retval] BSTR \*pbstrSession)

该方法把终端服务票和用户的名称传递给应用程序，该应用程序将试图建立一个回到发起机器的连接。 其返回一个可用于控制所述装置的对话字符串。 在一个实施例中，如果没有人正在使用所述装置，则随着连接的建立，起始状态将从 0 (可用的) 转变为 1 (连接) 到 3 (使用中)。 如果所述装置在使用中，起不会被用户立即控制。 为了断开所述对话，用该方法所返回的对话字符串调用断开方法。

(2) Disconnect ([in] BSTR bstrSession)

该方法断开用所述字符串参数表示的对话。 该值与所述连接方法返回的字符串相同。 在一个实施例中，随着连接的减少且所述装置恢复到它的默认设置，所述状态将从 3 (使用中) 转变到 2 (断开) 和 0 (可用)。

在已经更新了所述内部值之后，产生了用于下列变量的事件：A\_CurrentUser, A\_NextUser, A\_UserCount 和 A\_UserList。 值得注意的是，TS 网络协议具有下述特征，即调用在网络丢失事件中允许所述连接重新进行连接的自动重新连接。

(3) SetDisplayMode([in] BSTR bstrSession, [in] long DisplayMode)

如果对话参数与当前控制所述装置的用户对话参数相匹配，该方法就改变显示模式。

(4) SetResolution ([in] BSTR bstrSession, [in] long width, [in] long height, [in] long colorDepth)

[0113] 该方法设置用于所述对话的分辨率。

(5) GetUserName ([in] long position, [out] BSTR \* pbstrUser)

该方法对用户名称进行检索。

在一个实施例中，至于特性，实施下列非限制性功能：

(1) get\_A\_State([out, retval] long \*pState)

其检索所述装置的当前状态，并且在一个实施例中，所述有效值是：

DISPLAYSTATE\_AVAILABLE = 0,

DISPLAYSTATE\_CONNECTING = 1,

DISPLAYSTATE\_DISCONNECTING = 2,

DISPLAYSTATE\_JNUSE = 3,

DISPLAYSTATE\_INITIALIZING = 4。

所述默认值是 0。除了 0 之外的任一值表示设备忙并且不会试图进行连接。

(2) get\_A\_DisplayMode([out, retval] long \*pDisplayMode)

[0118] 其对所述装置的当前显示模式进行检索。

(3) get\_A\_CurrentUser([out, retval] BSTR \*pbstrUser)

其对在控制内的当前用户的当前名称进行检索。

(4) set A\_MaxUsers([out, retval] long \*pcUsers)

其对所述装置能够处理的最大数目的用户进行检索。

(5) get\_A\_Width([out, retval] long \*pWidth)

其对当前的水平分辨率进行检索。在一个实施例中，该值可以在从 800 到一个默认值为 1024 的可变的最大整数值 (MAXINT) 范围内进行变化。可以利用 SetResolution 来改变该值。

(6) get\_A\_Height([out, retval] long \*pHeight)

其对当前的垂直分辨率进行检索。在一个实施例中，该值可以在 600 到默认值为 768 的最大整数值 (MAXINT) 范围内变化。setresolution 可用

于改变该值。

(7) `get_A_ColorDepth([out, retval] long *pColorDepth)`

这是用于该颜色的每像素的位数。在一个实施例中，该值可以是 8、16、24、32 中的一个。其具有一个默认值 32，并且 `SetResolution` 可用于改变该值。

本发明可以选择性地与各种现有的可访问的基本设施和用户界面相结合。例如，如果罗伯特具有移动性缺陷并且颈部以下没有运动神经控制，则罗伯特可能利用带有电子指示器的在屏幕上的键盘来实现其计算目的，即，他能够使用该快捷键、更大的字体来选择投影仪显示器。由此，在本发明的一个具体实施例中，可以通过屏幕读出器读取投影的输出。因此，罗伯特能够用键盘访问所有的特征，尤其是鼠标操作密集的动作，例如，选择投影仪和膝上计算机显示器。还在菜单项和控制上设有键盘加速器（例如，快捷键）。在一个具体实施例中，逻辑键盘导航序列用于对话框和相似组的对象。在这种意义上讲，“逻辑”通常等于从左到右、和从上到下，其可以根据语言/文化来交换国际用户。

在一个具体实施例中，不用单一的颜色来在项目间进行区分，保证所有的传送的带有颜色的信息不带颜色也是可用的。关于系统设置，在各种具体实施例中，本发明支持可能的颜色的控制面板设置，否则利用标准前景和底色来画出允许用户设定彩色图像。并且，当通过可访问性控制面板（Accessibility Control Panel）设置高对比度标志时，省略了位图图像或在文本后面的其他复杂的背景和控制，用单色而不是多种颜色画出所述图像，并且用通过控制面板定义的标准系统颜色来替换特定应用程序的颜色，最可能少地使用配色。利用在控制面板中所选择的尺寸（即，屏幕规格）画出所述对象。并且，如果是画线，则要确定出适当的宽度而不是利用固定值。而且，在各种具体实施例中，任一定制控制都包括有效的可访问性属性。

距离和障碍物可以降低无线性能。因此，在本发明的各种具体实施例中，通过本发明的 UI 装置显示一图标表示信号品质。可以相应于障碍物、距离和要维持的数据速率示出信号品质的预定水平号。

本发明还可能与国际语言和多语言的用户界面技术相结合，以便当把所



述内容传递到外国用户所有的装置时，将根据外国用户的语言选择性地显示。

本发明的所述投影，根据其在 IP 网络上的出现，可以是有线的或者无线的。例如，在有线的情况中，约瑟夫在他的办公室(有线)中并且想要把一组幻灯片投影给在其办公室中的具有膝上计算机的(有线或者无线地连接)客人。人们注意到本发明适用于任一计算装置、PC 或其他的、而不只是移动装置。

在各种具体实施例中，1:1 投影包括发现、连接到所述备用显示器装置以及数据传输。发现可以是用户启动的或是当用户正在做某项工作时在所述背景中自动进行的，或者所述系统处于空闲状态，等等。1:1 的投影可以是伸展的或者镜像的(mirrored)。在所述扩展情况下，用一 UI 来使人们能够对备用显示器上的报告进行导航。例如，一个人可以使 PowerPoint 报告在投影仪上展示而一个人在发言人在膝上计算机屏幕上做记录时想要转向下一个幻灯片。在这种情况下，一个人可以利用膝上计算机屏幕上的 UI 来高亮度显示幻灯片上的某些东西或转到下一张幻灯片。因此，本发明慎重地考虑了下述情形，即可能有发送器显示的某一部分(例如，注解)是发送器不希望在呈现端被看到的，本发明还慎重地考虑了下述情形，即，可能有发送器显示的某一部分而不是呈现端的一部分作为数据的正常投影的一部分，而除了把该部分添加到所述投影上以便其可在呈现端看见。

在不同的实施例中，1:n 投影包括对正在进行的报告的网络的通知。规则还可以与所述报告相关联，其是可修改/可扩充的。规则的例子包括：(A) 能够参加/观看报告的人，(B) 密码或任一其他对报告的认证，(C) 在观看者一侧的报告的注解和/或该注解的记录/储存以及 (D) 内容权利管理规则的执行，例如，禁止打印幻灯片屏幕的能力。

投影还包括广播网络上出现的报告的能力，而不是实际在网络上的人。非基于 UPnP 的发现还可以在备用的具体实施例中实现。当发现可以经由如上所述的 IP 实现时，就可以利用任一协议实现发现，即，可以直接 ping 一台机器以便查看是否出现了报告。

作为用户体验部分，在一个实施例中，用户可以进入“View Presentation (观看报告)”模式并查看整个网络上正在进行的报告列表。接收器还可

以接收关于报告的通知，例如，报告在附近或有人特别想向你报告。

本发明还包括转让对其他连接用户的报告的控制的能力，借此任一用户都可以转让对他人的报告的控制。如上所提到的，可以有关于谁可以接受报告的控制、以及什么控制水平等的由拥有所述报告的人所指定的管理权。陈列了当前正在观看所述报告的人员列表的用户经验 (user experience) 包括如果被授权了，添加或删除某人的能力。本发明还慎重考虑了下述能力，即同时参加不同控制水平的多目标显示，即，可以为每个报告指定规则。

本发明还包括，只要可能，组合 1: 1 和 1: n 投影情形的能力。因为备用显示器装置，诸如投影仪，可以具有一列为其各自的报告而想要使用该备用显示器装置的装置，本发明包括一种装置用于管理使用装置的报告的排列。任一应用程序启动一种报告模式的能力，即，查看或启动一个新的报告。

如所提到的，本发明包括配置实际上显示什么的能力，即，音频和视频，只有音频，或只有视频。在一个实施例中，本发明还包括“Laser Pointer (激光指针)”功能，即，在报告期间，借助于辅助输入装置用户可以临时高亮度显示正在进行的报告中的某些东西，诸如“激光点”，其效果与辅助显示效果相当。例如，鼠标移动可以变为带有轨迹的激光指针的模仿。

在更多的具体实施例中，本发明提供了用于控制带有公开的和非公开的方面的内容的远程报告的系统和方法。关于这一点，本发明在想要发送（即，远程的、广播或别的传输）给客户装置（其他膝上计算机、投影仪等）的报告的公开内容，和想要保留其诸如象显示这样的功能的、公开内容正在被远程显示在服务器计算装置上的非公开内容之间进行区分。在本发明的用户界面的一个实施例中，默认地，在公布行为之前或与其同步地生成或改变的内容，诸如“打印”到 TabletPC (平板电脑) 范围内的日志，是公开的内容，并且在公布行为之后所进行的内容的变更（例如，注解、高亮度显示、其他添加、公开内容的掩饰、删除等。）构成了非公开内容基础。在本发明用户界面的另一个实施例中，用户可以对内容采取某一行动，并指定某一或全部用该行动所添加的、掩饰的或删除的最后所得到的内容为非公开的。从而，在内容远程经验期间，客户装置只显示公开内容，而用于显示的非公开内容仍留在服务器装置中。

有益地，包括服务器装置的非公开内容的所述报告，与客户装置的显示保持同步，例如，当正在呈现幻灯片的放映时，在服务器装置处的幻灯片的改变将相应地改变客户装置处的幻灯片。还有一个优点，报告者能够控制经由本发明的用户界面装置发送给客户装置的不变的公开内容的显示，同时保留观看服务器计算装置上的非公开内容的能力（例如，通过输入页面上移/页面下移或其他用于 PowerPoint 幻灯片放映的类似命令）。

关于这一点，当利用软件显示内容时，诸如 PowerPoint、Journal、Excel、Word、XML、HTML 等等，所述报告者通常让其内容返回到屏幕。例如，其可以笨拙地确保听众所看到内容与报告者正在谈及的内容相同，其要求发言人请其他人来向下放映公开的幻灯片组，或者，如果发言人正在向下放映该组幻灯片，则发言人必须不时地向后看屏幕以确保该组处于正确的点上，这会中断报告的流程。因此本发明随着发言人在计算机上的非公开报告的进行，远程地进行所述卡片组的公开的报告。因此，本发明有利地使发言人能利用计算机的性能对一份卡片组进行注释，但是当对公众进行显示时，只显示“公开”部分的卡片组—非公开注释并不对公众显示。例如，发言人可以利用墨水标出其想要强调的点或利用补充的论点，对每个报告幻灯片进行注释，当显示幻灯片组（在发言人计算装置的控制下）时，本发明的远程控制特征保证了公众正在观看的与发言人 PC 上所显示的幻灯片相同，同时，本发明的公开-非公开特征隐藏了非公开注释/涂改以便只显示所述幻灯片组的公开部分。

在图 8A 中给出了幻灯片放映的示例性幻灯片 800。幻灯片放映的示例性公开内容 810 包括一个“Agenda（议程）”标题和各种论点，所述论点包括“Introduction（介绍）”、“Current status（当前状态）”、“Options for consideration（考虑的选项）”和“Next Steps（下一步）”。就象在此处所描述的其他具体实施例，当前所描述的具体实施例还使内容 810 从一个报告的背景中的计算装置扩展到一组人，不论他们是否在同一房间内或远程分散地。在一个实施例中，考虑了一种笔触式计算装置，诸如 TabletPC（平板计算机）。例如，笔触式计算装置是用于诸如幻灯片放映报告的注释文件的大型工具。因此，如图 8B 所示，幻灯片 800 包括公开内容 810，其可以带有发言人的注解、附图、视频、相片文字等等。作为一个非限制性

例子，注释 840 给出了在对幻灯片 800 的陈述期间对陈述幻灯片放映的内容以进行演说的发言人的提示。对于另一非限制性例子来说，幻灯片 800 部分可以利用高亮度显示 830 而被高亮度显示。在每种情况中，发言人都会希望只远程地显示公开内容 810。因此，根据本发明，结合执行诸如注释或高亮度显示这样的行动，改变了所述内容，作者可以指定所述行动的结果是非公开内容，以便该非公开内容只显示在服务器装置上，通过该服务器装置公开内容 810 正在被远程地显示到客户装置上。如上述，默认行为也可以指定哪些内容是公开的 and 哪些内容是非公开的。例如，一旦 TabletPC 的内容向 Journal 公布，则该内容包括公开内容，然而，默认地，随后对该内容的涂改可以被认为是非公开的。因此，当图 8B 的所述内容(公开和非公开的)被远程显示在客户装置上时，例如其他膝上计算机、投影仪等等，所述客户装置就接收图 8A 所给出的视图。

在图 8C 所示出的另一类似的情形中，作者可能想要从公开内容 810 中删除或掩饰细节，例如，想要从报告细节中抽出某些内容。例如，公开内容 810 可以包括发言人在讲演所述报告期间将发现其会分散大家的注意力的视频、相片等等。因此，如图 8C 所示，作者可以删除、或屏蔽或掩饰一些公开内容 810，并指明擦除/掩饰的内容 850 作为非公开的内容，以便当图 8C 的内容(公开和非公开的)被远程显示给客户装置时，所述客户装置接收图 8A 中所示出的视图，而服务器装置将显示图 8C 中的视图。作为选择，所述报告者可以取消非公开/公开的区别，由此客户装置将会收到所述非公开的内容。并且，所述报告者还可以进行选择以便只观看所述公开内容(或只观看所述非公开的内容)。

因此，本发明可以在要被发送到备用显示器装置的文件的情况下实施，其中可以认为所述文件是两个版本，即，所述文件的第一个版本和第二个版本，前者为公开的，后者包括非公开的内容，其中所述非公开的内容用第一和第二版本(添加或删除)之间的增量(delta)表示。如所提到的，本发明并不局限于此，诸如 TabletPC 这样的笔触式计算装置提供了一种示例性的环境用于实施本发明。例如，平板计算机包括把文件输入 Journal (第一个版本)的能力，此后由此，所述平板笔可用于注释或改变文件图象(第二个版本)。通过将其“打印(printing)”到所述 Journal 而把文件输入所述



Journal 中。汇报 (Reports)、表格、报告、电子表格、图形、相片、网页等等都能被输入到所述 Journal 中。在这点上,如果所述文件可以被打印,则其可以被输入所述 Journal 中并被注释,而不用改变输入文件的任何原始内容。例如,如果一个人在去开会的途中,则一个人可以把会议议程(例如,一种便于携带的的文档格式(pdf)文件、字处理文件、电子表格、幻灯片放映文件、电子邮件文件等等)输入 Journal。然后,利用所述平板笔,可以在正在演说的议程的项目上做笔记。由此一个人对所述文件的感想可以被简单地记录并观看。例如,一个人可以把平板计算机的内容投影到会议室中的大屏幕监视器上,把文件的图像输入 Journal 和/或开始把评论放到所述文件图象上。

所述 Journal 的作者是一台虚拟的打印机,其对把文件图象输入到 Journal 记录中进行管理。因此,任一可以让你打印的程序都可以发送文件到所述 Journal 作者处,正象其正在打印到一物理打印机上一样。所述 Journal 能因此把所述文件转换成一文件图象,其用作 Journal 记录的背景。在 Journal 中,至少可以用三种方法产生一文件图象:利用不同程序的打印命令(如果所述文件在另一程序中是打开的,则该命令是有用的),利用 Journal 输入命令(如果你正在进入 Journal 并想要输入文件,则该命令是有用的),和/或利用搜寻软件的拖放式特征,诸如 Windows Explorer (可用于直接把文件拖入 Journal 中)。任一输入 Journal 中的文件都被输入一个新的记录中,作为一组背景图象。这些背景图象的内容,不能在 Journal 中被改变,并由此,这些背景图象适于根据本发明发送给备用显示器装置的报告公开的内容。

有多种实施本发明的方法,例如,一个合适的 API、工具箱(tool kit)、驱动程序代码、操作系统、控制、独立的或可下载的软件对象等等,其使应用程序和服务能够使用本发明的无线投影系统和方法。本发明基于下述内容慎重地考虑了本发明的使用问题,即 API (或其他软件对象)、以及接收内容和/或根据装置的发现进行请求的软件或硬件对象以及根据本发明的内容的接收和传送协议。因此,在此所描述的本发明的各种实施,可以完全为硬件、部分为硬件和部分为软件、以及完全为软件。

如上述,当已经结合各种计算装置和网络体系结构描述了本发明的示例

性的具体实施例时，所述基础概念可以被用于任一想要把内容投影到另一装置或从另一装置接收投影内容的计算装置或系统。例如，所述算法和本发明的硬件实现可以被用于计算装置的操作系统，其作为所述装置上的独立的对象/作为另一对象的一部分、作为一个可以再用的控制、作为一个可从服务器下载的对象、作为装置或对象以及所述网络之间的“中间人”、作为一个分布式对象、作为硬件而被提供，在存储器中，任何上述的组合等等。当在此选择了示例性的编程语言、名称以及例子作为各种选择的代表时，这些语言、名称以及例子并不是用来进行限制的。本领域中普通技术人员将知道，有多种提供与利用本发明各种具体实施例所实现的功能相同、类似或等效的目标代码和术语的方法。

如所提到的，此处所描述的各种技术可以结合硬件或软件或只要合适则为两者的组合来实施。因此，本发明的方法和装置，或其某一方面或部分，可以采取包含在有形介质内的程序代码(即，指令)的像是，其中，当诸如计算机这样的机器载入并执行所述程序代码时，该机器就成为计算机，所述计算装置通常包括一处理器、一处理器可读的存储介质(包括易失和非易失性存储器和/或存储元件)，至少一个输入装置、和至少一个输出装置。可以实施或利用本发明的无线内容投影技术的一个或多个程序，例如，通过使用数据处理 API、可重用的控制等等，最好用高级程序或面向对象的编程语言实现以与计算机系统通信。然而，如果想要的话，所述程序还可以用汇编或机器语言来实现。总之，所述语言可以是一种编译或解释语言，并结合硬件实现。

本发明的所述方法和装置，还可以经由通信来实施，所述通信包括有在某种传输介质上面传输的程序代码，诸如在电线电缆上、通过光纤、或通过任一其他传输形式，其中，当收到程序代码并载入和由下述这样的机器执行时，诸如 EPROM、门阵列、可程序逻辑设备 (PLD)、客户计算机等等，该机器就变成了一个用于实施本发明的装置。当在通用处理器上实现时，所述程序代码就结合该处理器来提供一个唯一的装置，该装置促使了对本发明的功能的调用。另外，任一结合本发明所使用的存储技术一直可以是硬件和软件的结合。

当结合各附图的优选实施例来描述本发明时，应该理解的是，还可以使

用其他类似的具体实施例或者可以对所描述的具体实施例进行修改和添加，以执行和本发明相同的功能而不偏离本发明。例如，当在联网环境的情况下，对本发明的示例性网络环境进行描述时，诸如对等网络环境，本领域中的普通技术人员将认识到本发明并不局限于此，并且在本申请中所描述的方法可以适用于任一计算装置或环境，诸如一个游戏控制台、手持式计算机、便携式计算机等等，不管有线还是无线，都可以应用于许多经由通信网络所连接的这种计算装置，并在网络上进行交互。此外，应该强调一点，即，可以考虑各种计算机平台，包括手持式装置操作系统及其他特定应用的操作系统，尤其是随着无线联网装置数目的继续激增。

当示例性具体实施例，提及了在膝上计算机和投影仪的情况下使用本发明时，本发明并不局限于此，而是可以被实现为把来自任一包括本发明的功能的计算装置的内容的无线传输提供给一个或多个也包括本发明的功能的其他计算装置。而且，源计算装置甚至不必单独具有显示器。例如，利用一个带有最小处理资源的移动存储装置，可以根据本发明把内容从该移动存储装置传输给一个备用显示器装置，而不必具有单独的显示能力。更进一步地，本发明可以在多个处理芯片或装置中或者跨多个处理芯片或装置地实施，并且可以跨多个装置地对存储器产生类似的影响。因此，本发明不应局限于任一单个具体实施例，而是应该广义地进行解释以及根据所附权利要求的范围进行解释。

200410092108.4

说明书附图

第1/15页

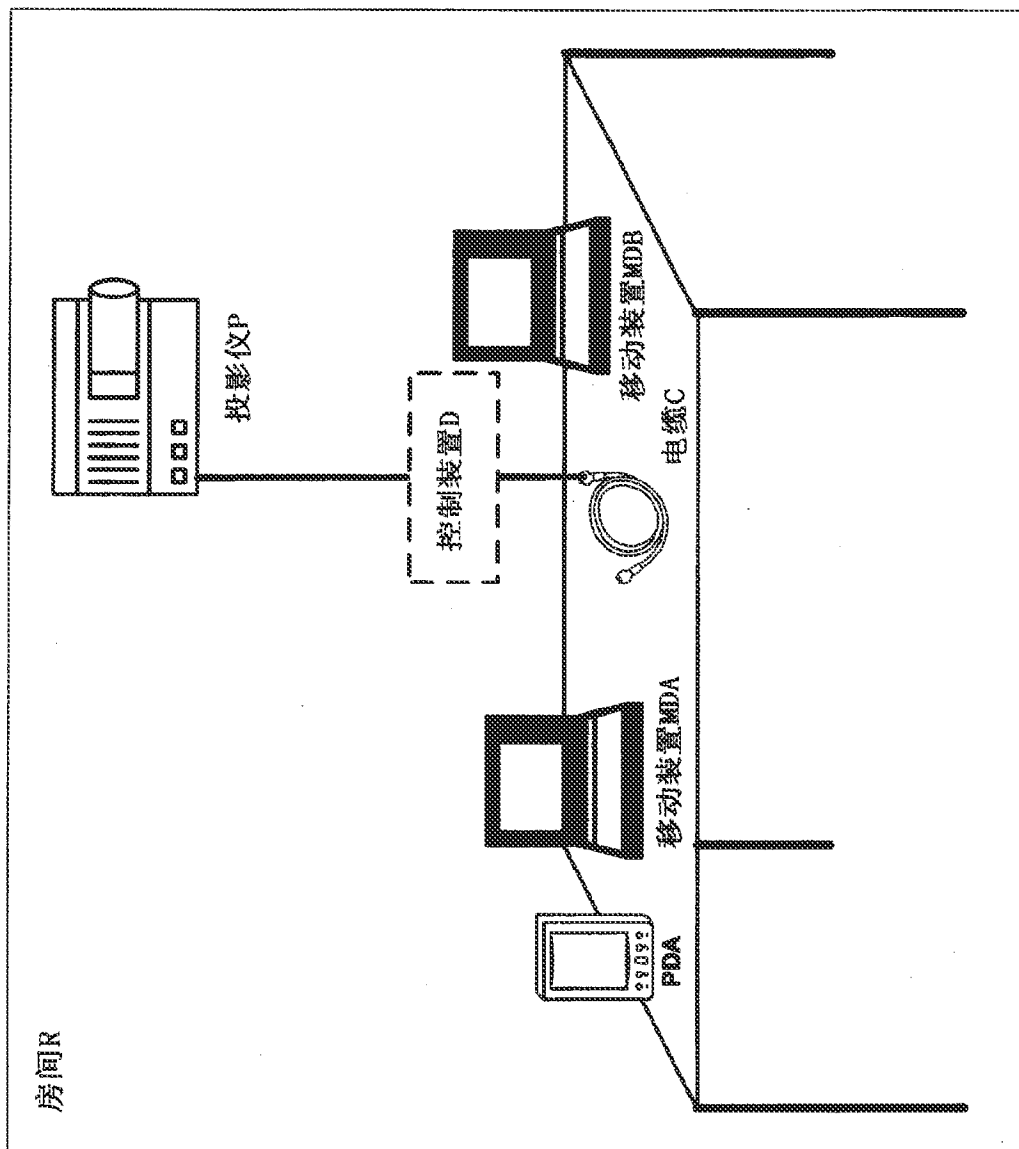
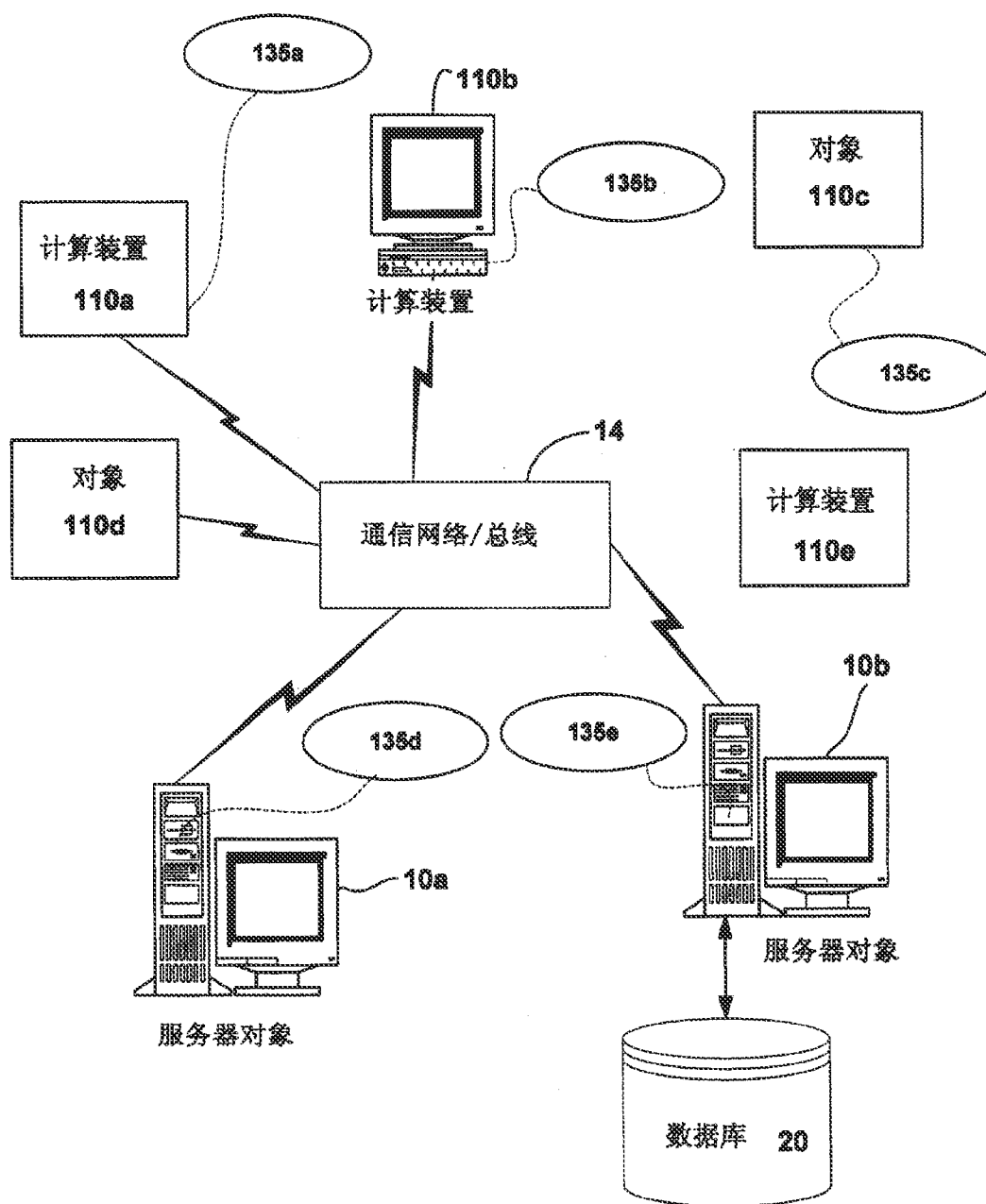


图1  
现有技术



 2A

200410092108.4

说明书附图 第3/15页

计算环境 100

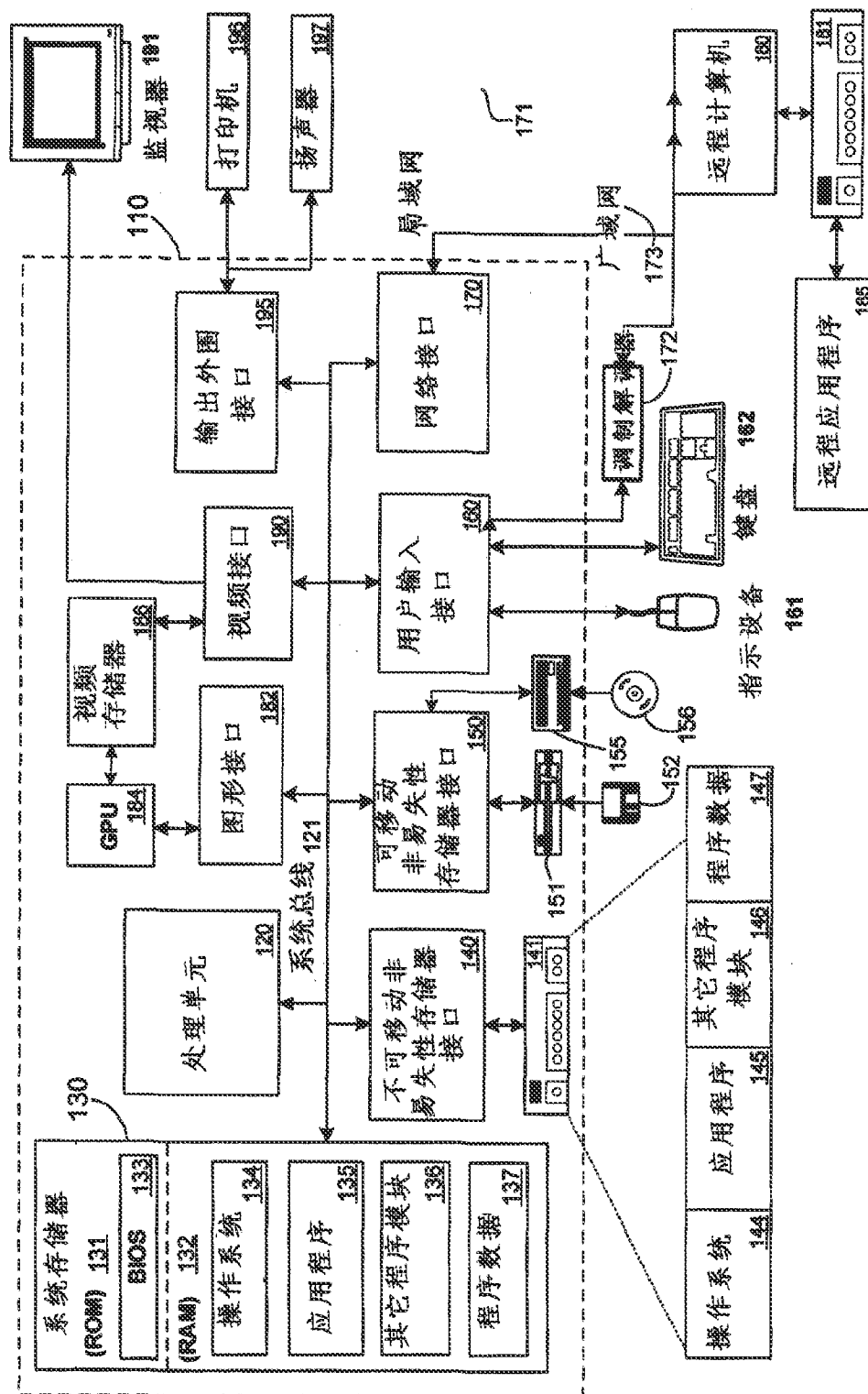


图 2B

200410092108.4

说明书附图 第4/15页

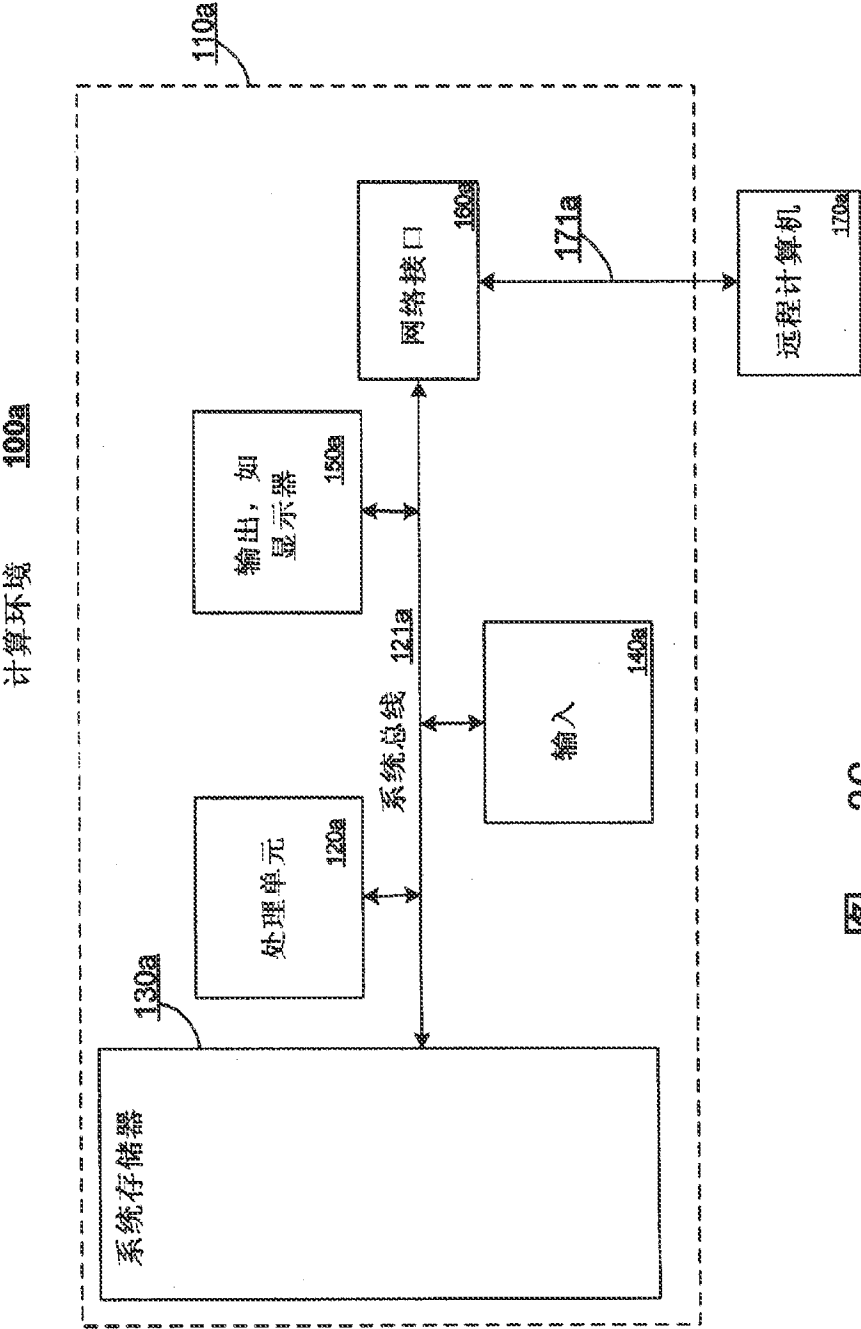


图 2C

200410092108.4

说明书附图 第5/15页

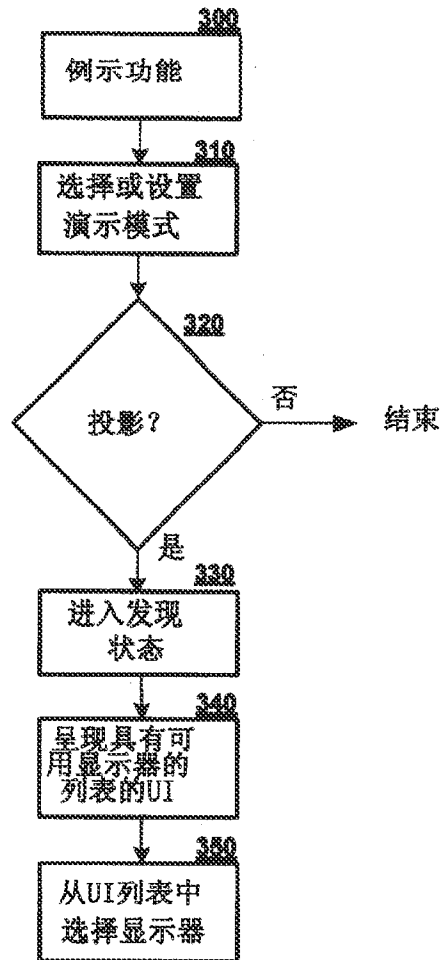


图 3

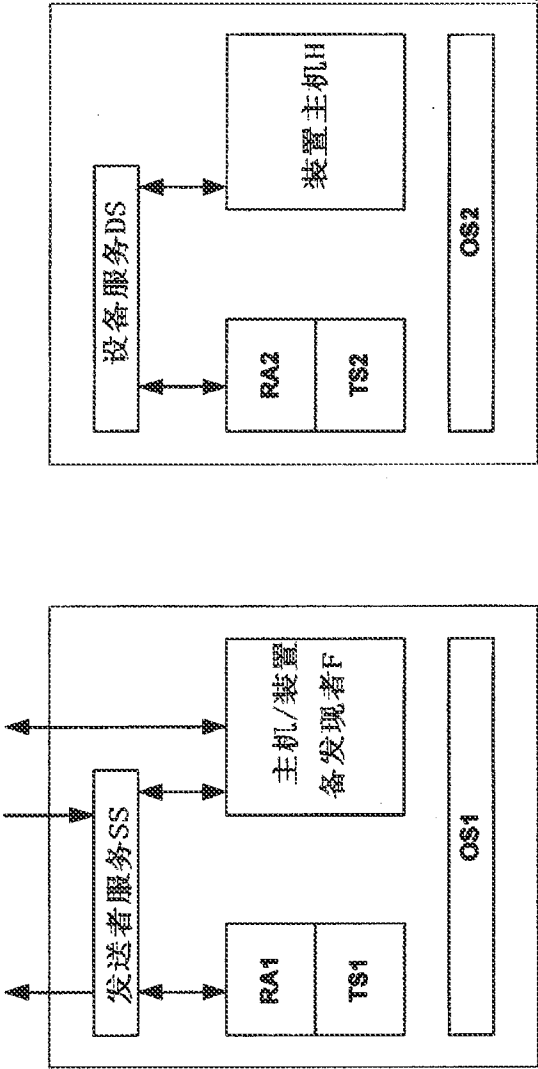


图 4A

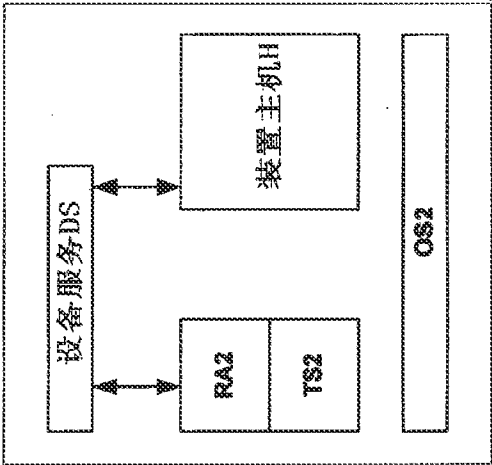


图 4B

200410092108.4

说明书附图 第7/15页

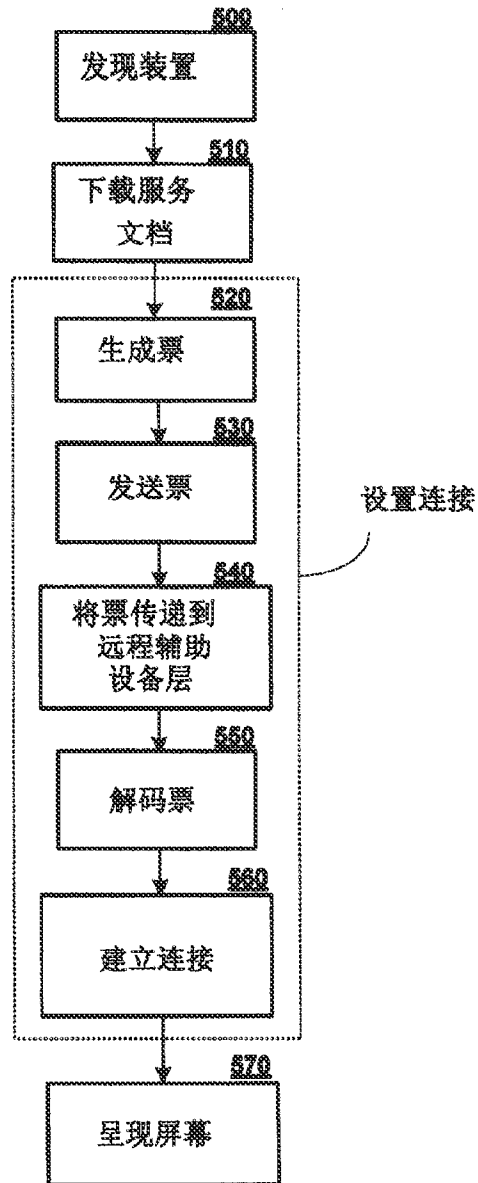


图 5

200410092108.4

说明书附图 第8/15页

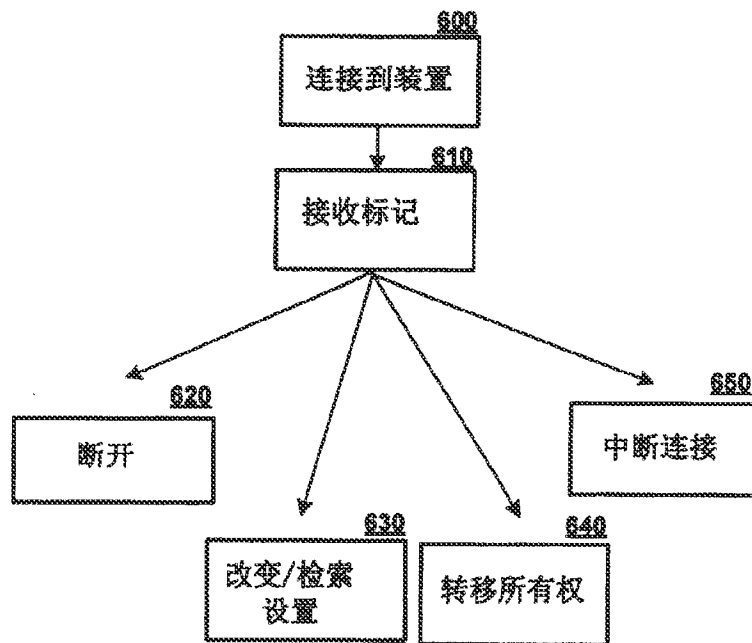


图 6

200410092108.4

说明书附图 第9/15页

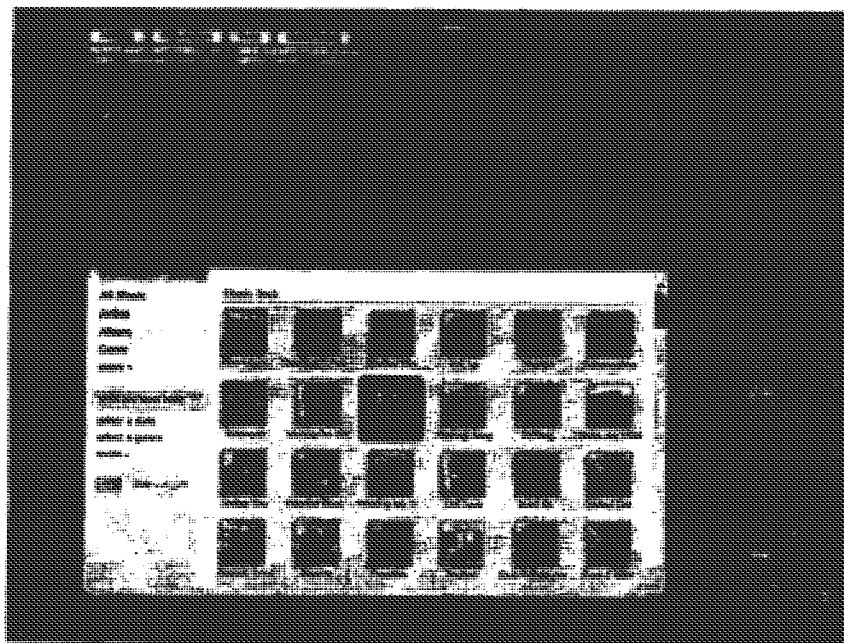


图 7A

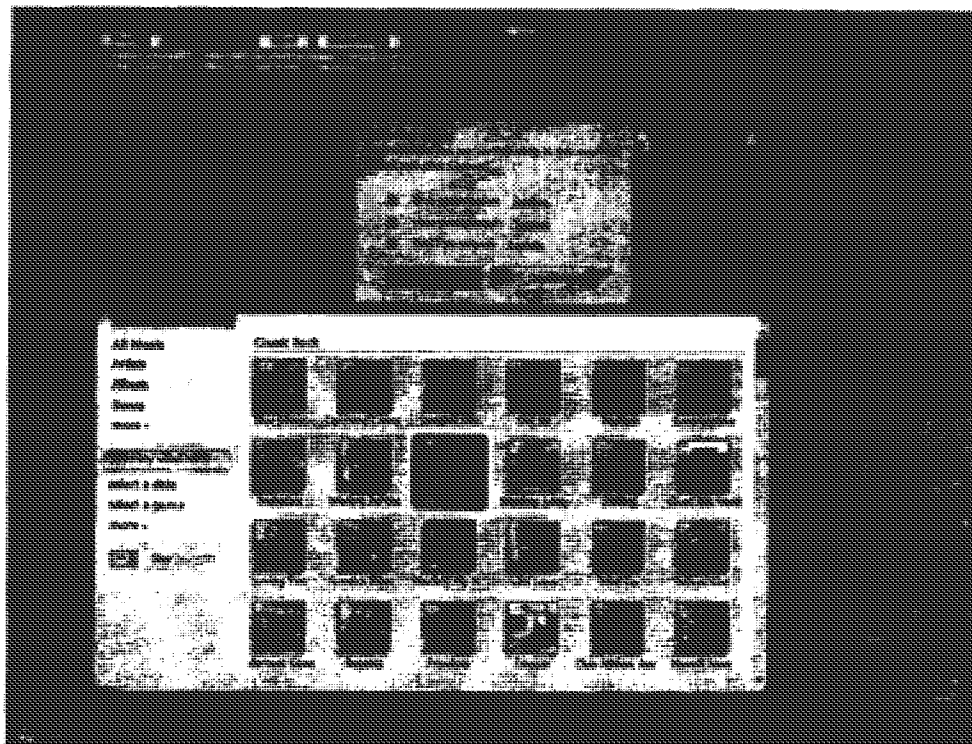


图 7B



200410092108.4

说明书附图 第10/15页

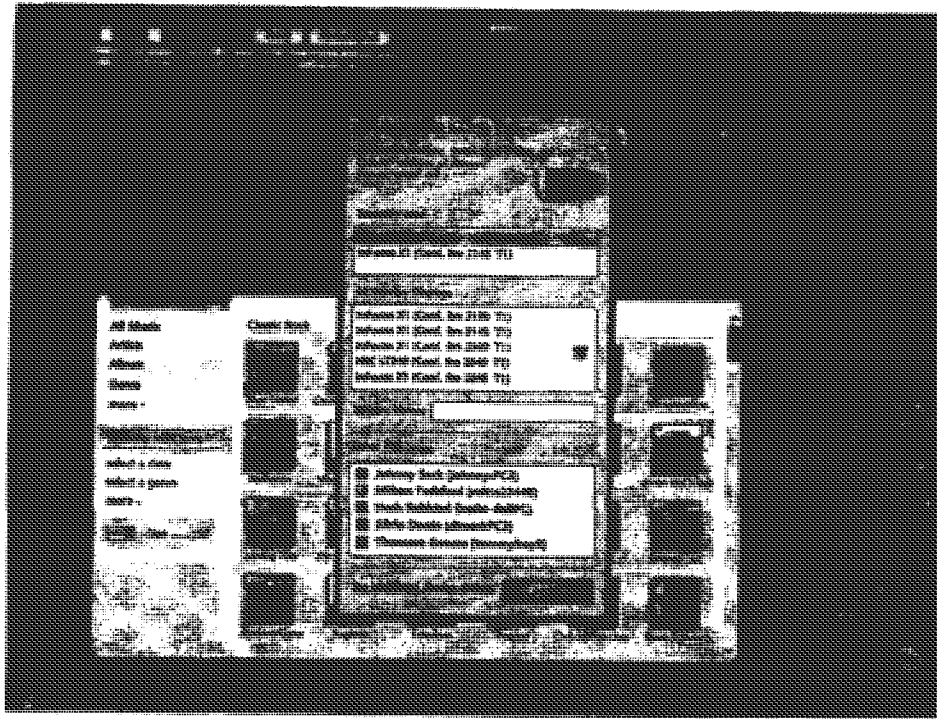


图 7C

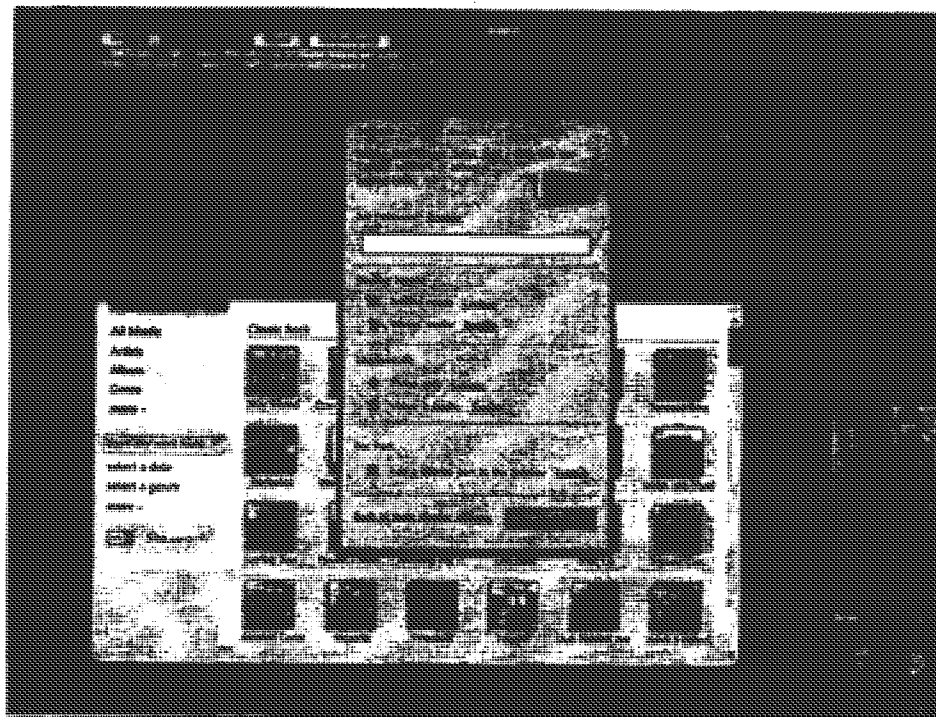


图 7D

200410092108.4

说明书附图 第11/15页

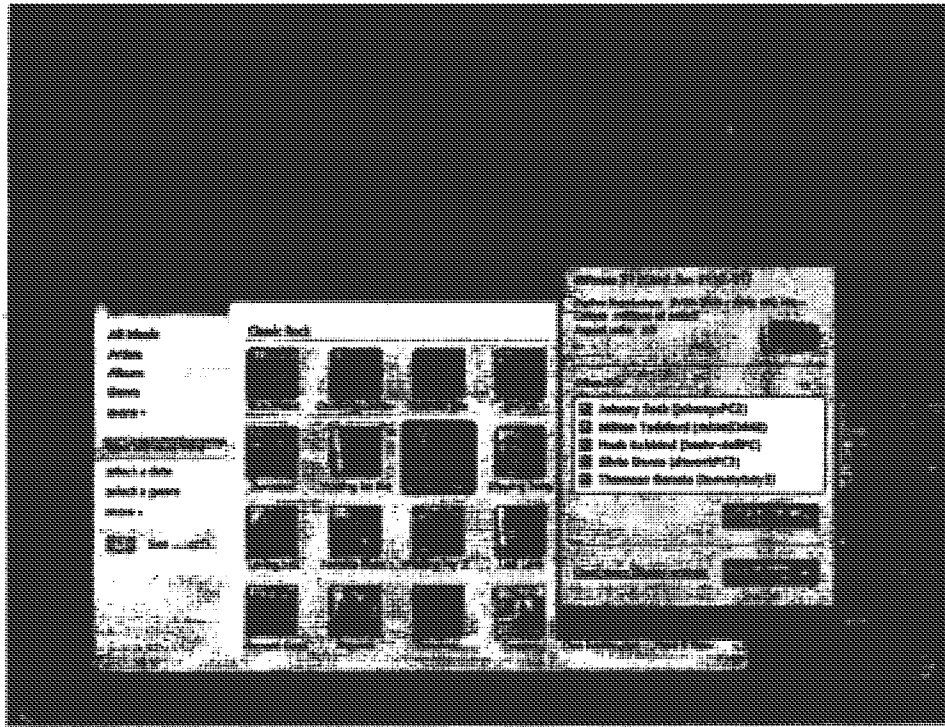


图 7E

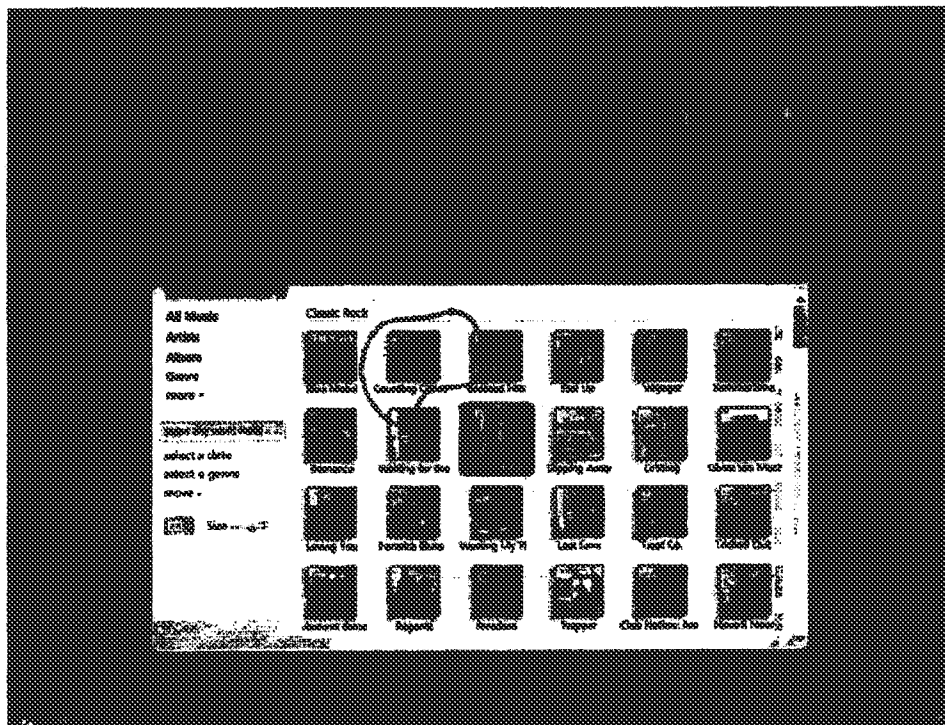


图 7F

200410092108.4

说明书附图 第12/15页

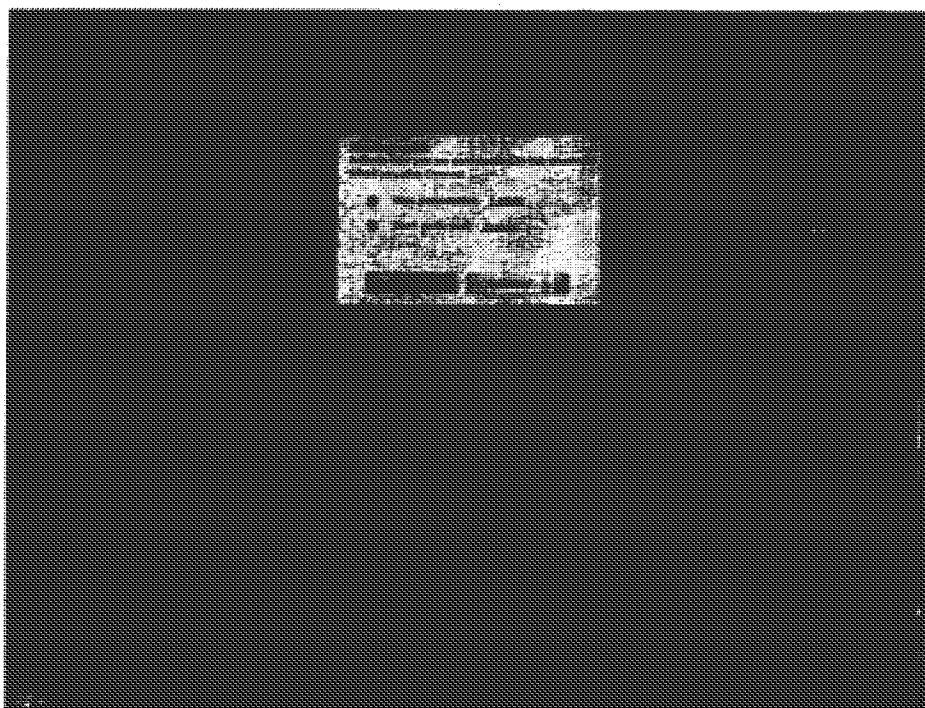


图 7G

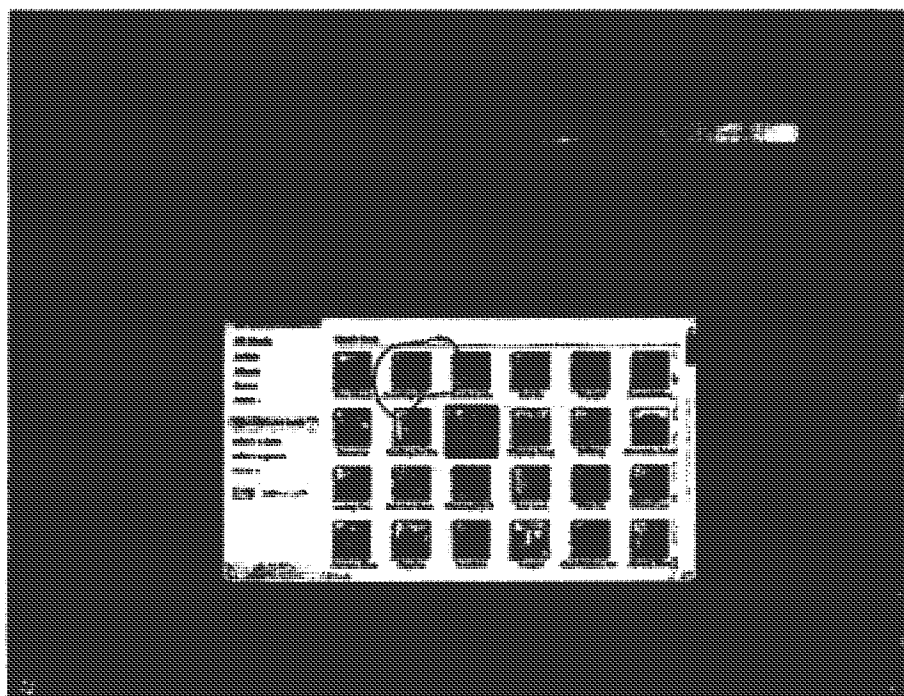


图 7H

200410092108.4

说明书附图 第13/15页

800

## Agenda

810

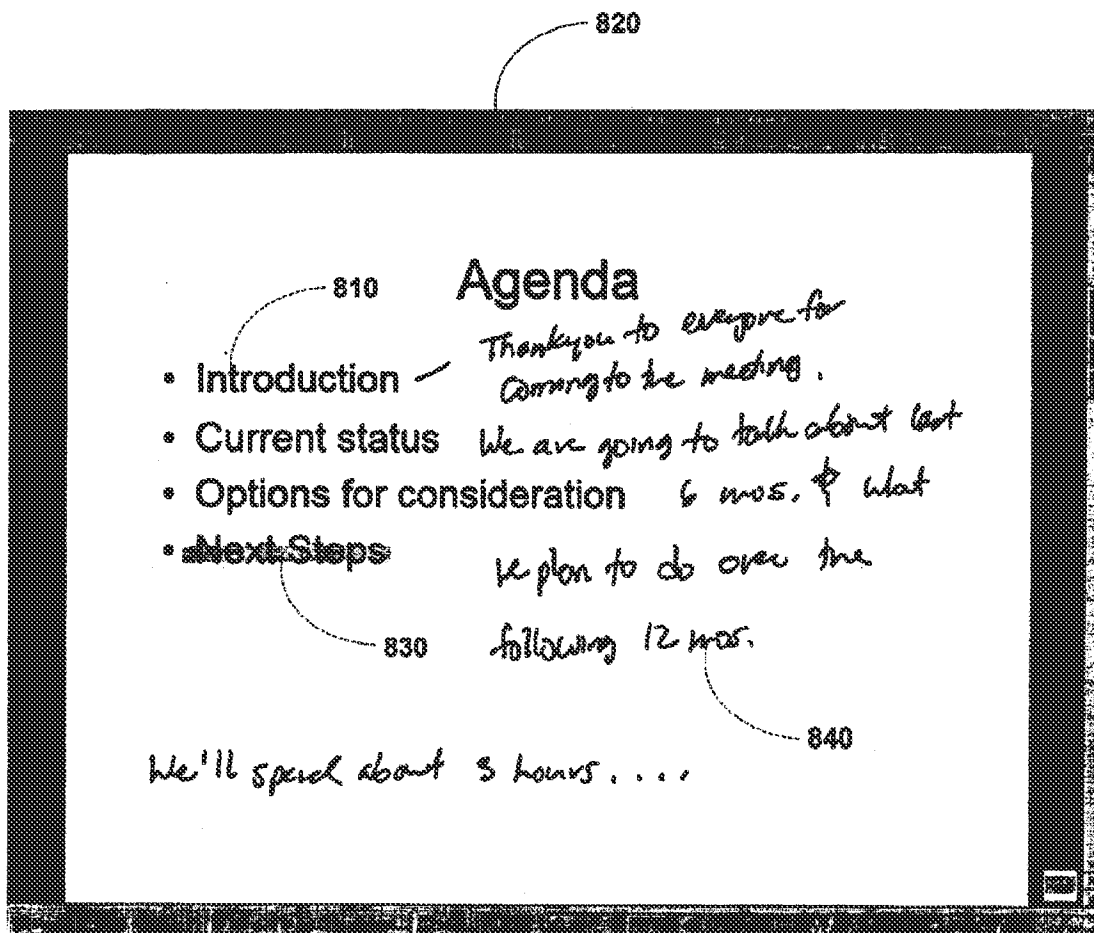
- Introduction
- Current status
- Options for consideration
- Next Steps



8A

200410092108.4

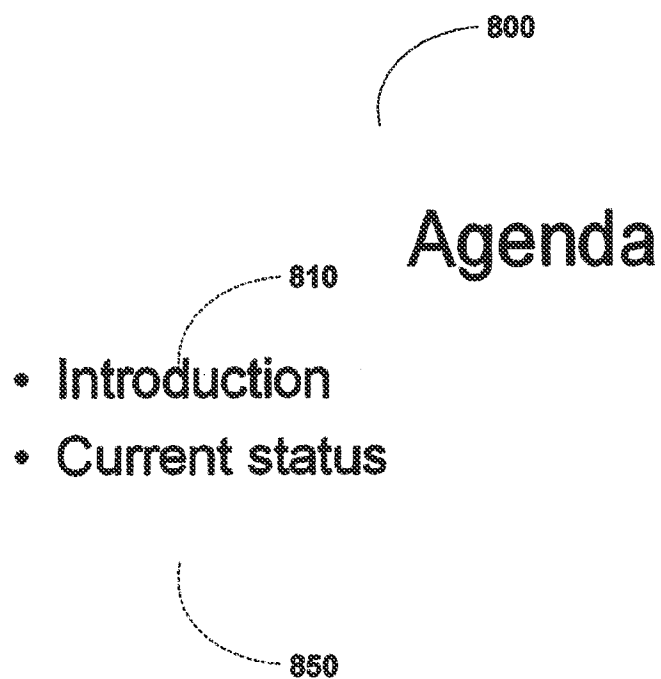
说明书附图 第14/15页



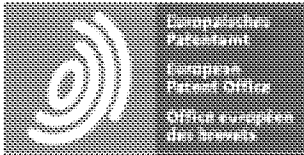
8B

200410092108.4

说明书附图 第15/15页



8C



Espacenet

CN102065267A Method and apparatus for sharing data in video conference system

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Inventors: MANCHUL CHOI

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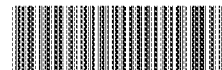
Published as: CN102065267A; CN102065267B; EP2323383A2; EP2323383A3; EP2323383B1; KR101583088B1; KR20110051787A; US2011109716A1; US8300784B2

Method and apparatus for sharing data in video conference system

Abstract

A method and an apparatus for sharing data in a Video Conference System (VCS) are provided. According to an embodiment, when a user wants to share data with the other party in the VCS, only a user selected region and not the entire screen is converted into a format optimized for the other party's display and then transmitted to the other party.

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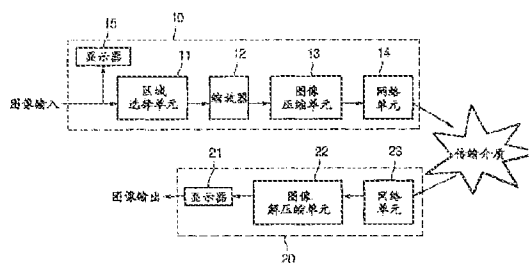
权利要求书 2 页 说明书 8 页 附图 8 页

### (54) 发明名称

在视频会议系统中共享数据的方法和装置

### (57) 摘要

本发明涉及在视频会议系统中共享数据的方法和装置。根据实施方式,当用户希望在视频会议系统中与另一方共享数据时,仅将用户选择的区域而不是整个画面转换为针对另一方的显示器最优化的格式,然后将其发送到另一方。



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1. 一种用于与第二终端合作来提供视频会议的第一终端,该第一终端包括:  
显示器,其被构成为显示包括第一窗口和第二窗口的多个窗口,所述第一窗口被构成为显示所述第二终端处的至少一个用户的图像,所述第二窗口被构成为显示所述第一终端的与所述视频会议相关联的内容;  
用户输入单元,其被构成为接收用户对所述第二窗口上显示的内容的一部分的选择;  
区域选择单元,其被构成为提取所述第二窗口上显示的内容的所选择部分;以及  
网络单元,其被构成为向所述第二终端发送所述内容的所提取部分。
2. 根据权利要求1所述的第一终端,其中,所述第二窗口上显示的内容是图像或文本。
3. 根据权利要求1所述的第一终端,其中,当所述第二窗口上显示的内容包括文本时,所述显示器被进一步构成为显示请问是否将所述文本单独发送到所述第二终端的弹出窗口。
4. 根据权利要求1所述的第一终端,其中,所述多个窗口进一步包括第三窗口,该第三窗口用于显示所述内容的已发送部分在所述第二终端的显示图像。
5. 根据权利要求1所述的第一终端,该第一终端进一步包括:  
图像压缩器,其被构成为对所述内容的所提取部分进行压缩;和/或  
缩放器,其被构成为对所述内容的所提取部分进行缩放。
6. 根据权利要求1所述的第一终端,其中,所述显示器在弹出窗口中显示所述内容的所提取部分。
7. 根据权利要求1所述的第一终端,其中,所述网络单元从所述第二终端接收在所述第二终端上显示的已发送的所述内容的所提取部分的画面状态信息,并且,所述显示器显示接收到的画面状态信息。
8. 根据权利要求1所述的第一终端,其中,根据用户输入而改变在所述显示器上显示所述多个窗口的方式。
9. 根据权利要求1所述的第一终端,其中,所述显示器显示所述第二终端的显示器的分辨率信息或尺寸信息。
10. 根据权利要求1所述的第一终端,其中,所述显示器进一步在所述第二窗口上显示指示符,该指示符用于改变要选择的内容部分的尺寸。
11. 根据权利要求1所述的第一终端,该第一终端进一步包括:  
确定单元,其被构成为确定在所述内容的所选择部分中是否包括文本;以及  
文本提取单元,其被构成为如果所述确定单元确定了在所述内容的所选择部分中包括文本,则从所述内容的所选择部分中提取所述文本,  
其中,所述网络单元仅仅将从所述文本提取单元输出的所提取文本发送到所述第二终端。
12. 根据权利要求11所述的第一终端,其中,在将任何内容发送到所述第二终端之前,所述显示器显示用于询问用户是否要将所提取的文本发送到所述第二终端的消息。
13. 一种用于与第二终端合作提供视频会议的方法,该方法包括以下步骤:  
由第一终端的显示器显示包括第一窗口和第二窗口的多个窗口,所述第一窗口被构成为显示所述第二终端处的至少一个用户的图像,所述第二窗口被构成为显示所述第一终端的与所述视频会议相关联的内容;

由所述第一终端接收用户对所述第二窗口上显示的内容的一部分的选择；

由所述第一终端的区域选择单元提取所述第二窗口上显示的内容的所选择部分；以及  
由所述第一终端将所述内容的所提取部分发送到所述第二终端。

14. 根据权利要求 13 所述的方法，其中，所述第二窗口上显示的内容是图像或文本。

15. 根据权利要求 13 所述的方法，该方法进一步包括以下步骤：

当所述第二窗口上显示的内容包括文本时，在所述第一终端的所述显示器上显示请问是否要将所述文本单独发送到所述第二终端的弹出窗口。

16. 根据权利要求 13 所述的方法，其中，所述多个窗口进一步包括第三窗口，该第三窗口用于显示所述内容的已发送部分在所述第二终端的显示图像。

17. 根据权利要求 13 所述的方法，该方法进一步包括以下步骤：

由所述第一终端对所述内容的所提取部分进行压缩；和 / 或

由所述第一终端对所述内容的所提取部分进行缩放。

18. 根据权利要求 13 所述的方法，其中，显示步骤在弹出窗口中显示所述内容的所提取部分。

19. 根据权利要求 13 所述的方法，该方法进一步包括以下步骤：

由所述第一终端从所述第二终端接收在所述第二终端上显示的已发送的所述内容的所提取部分的画面状态信息；以及

在所述第一终端的所述显示器上显示接收到的画面状态信息。

20. 根据权利要求 13 所述的方法，其中，在显示步骤中，根据用户输入而改变在所述显示器上显示所述多个窗口的方式。

21. 根据权利要求 13 所述的方法，该方法进一步包括以下步骤：

在所述第一终端的所述显示器上显示所述第二终端的显示器的分辨率信息或尺寸信息。

22. 根据权利要求 13 所述的方法，该方法进一步包括以下步骤：

在所述第二窗口上显示指示符，该指示符用于改变要选择的内容部分的尺寸。

23. 根据权利要求 13 所述的方法，该方法进一步包括以下步骤：

由所述第一终端确定在所述内容的所选择部分中是否包括文本；以及

如果确定步骤确定了在所述内容的所选择部分中包括文本，则由所述第一终端从所述内容的所选择部分中提取所述文本，

其中，所述第一终端仅仅将所提取的文本发送到所述第二终端。

24. 根据权利要求 23 所述的方法，该方法进一步包括以下步骤：

在将任何内容发送到所述第二终端之前，在所述第一终端的所述显示器上显示用于询问用户是否要将所提取的文本发送到所述第二终端的消息。

## 在视频会议系统中共享数据的方法和装置

### 技术领域

[0001] 本发明涉及在视频会议系统 (VCS) 中共享数据的方法和装置。

### 背景技术

[0002] 通过除图像传输以外还发送个人计算机 (PC) 的内容, VCS 具有促进视频会议发展的功能。通过在 VCS 中接收 PC 的视频输出信号, 按 VCS 能够发送的尺寸来缩放所接收的信号, 压缩经过缩放的画面的图像, 并且经由网络发送压缩后的图像, 从而实现内容传输。

[0003] 通常, 由于 PC 的分辨率相对较高, 所以 PC 基于 VCS 的图像压缩性能而降低其分辨率。与图像不同, 由于内容在很多情况下包括文本, 所以当由于降低分辨率的操作导致图像质量较差时, 很难识别内容。尤其是, 当通过应用于便携式装置的 VCS 功能来观看内容时, 由于 PC 画面的缩放度相对较高, 所以几乎不能识别文本。

[0004] 因此, 非常需要一种方法来解决由于降低分辨率的操作而导致的上述限制。

### 发明内容

[0005] 本发明的实施方式提供了一种方法和装置, 该方法和装置解决当用户和另一方的显示器在视频会议终端中具有各自不同的分辨率和尺寸时与现有技术向相关联的限制。

[0006] 本发明的实施方式还提供了一种方法和装置, 该方法和装置通过当用户希望在视频会议系统中与另一方共享数据时仅提供用户利用为另一方的显示器进行了优化的格式所选择的部分, 来解决与由于参与视频会议的不同用户的装置之间的不同性能而导致的与现有技术相关联的限制。

[0007] 本发明的实施方式还提供了一种方法和装置, 该方法和装置通过考虑用户希望共享的数据是否仅包括文本来减少数据传数量。

[0008] 本发明的实施方式提供了一种用于提供视频会议的方法和装置, 该方法和装置解决了与现有技术相关联的限制和缺点。

[0009] 根据实施方式, 本发明中提供了一种 VCS 的数据共享方法, 其中, 如果用户希望与另一方共享数据, 则不发送整个画面, 而仅将用户选择的区域转换为针对另一方的显示器进行了优化的格式, 以便按转换后的格式发送内容。

[0010] 在本发明的一个实施方式中, 一种用于视频会议系统的终端包括: 显示器, 其被构成为显示用户或另一方的图像; 用户输入单元, 其被构成为接收用户的输入; 区域剪切单元, 其被构成为检测并捕捉用户选择的图像区域; 以及网络单元, 其被构成为发送捕捉到的图像区域。

[0011] 在本发明的另一个实施方式中, 一种用于视频会议系统的终端包括: 用户输入单元, 其被构成为接收用户的输入; 网络单元, 其被构成为接收由另一方从显示在该另一方的显示器上的图像中选择的选择区域的图像; 以及显示器, 其被构成为显示接收到的所述选择区域的图像。

[0012] 在本发明的另一个实施方式中, 一种在视频会议系统中发送数据的方法包括以下

步骤:检测在显示在用户终端的显示器上的图像的区域上的用户选择;捕捉所选择的区域的图像;以及向另一方的终端发送所捕捉到的图像。

[0013] 在本发明另一个实施方式中,一种在视频会议系统中接收数据的方法包括以下步骤:接收由另一方从显示在该另一方的显示器上的图像中选择的选择区域的图像;以及显示接收到的所述选择区域的图像。

[0014] 根据一个实施方式,本发明提供了一种用于与第二终端合作来提供视频会议的第一终端,该第一终端包括:显示器,其被构成为显示包括第一窗口和第二窗口的多个窗口,所述第一窗口被构成为显示所述第二终端的至少一个用户的图像,所述第二窗口被构成为显示与视频会议相关联的所述第一终端的内容;用户输入单元,其被构成为接收对所述第二窗口上显示的内容的一部分的用户选择;区域选择单元,其被构成为提取对所述第二窗口上显示的内容的所选择部分;以及网络单元,其被构成为向所述第二终端发送所述内容的所提取部分。

[0015] 根据另一个实施方式,本发明提供了一种用于与第二终端合作提供视频会议的方法,该方法包括以下步骤:通过第一终端的显示器显示包括第一窗口和第二窗口的多个窗口,所述第一窗口被构成为显示所述第二终端的至少一个用户的图像,所述第二窗口被构成为显示与视频会议相关联的所述第一终端的内容;通过所述第一终端接收对所述第二窗口上显示的内容的一部分的用户选择;通过所述第一终端的区域选择单元提取对所述第二窗口上显示的内容的所选择部分;以及通过所述第一终端向所述第二终端发送所述内容的所提取部分。

[0016] 在以下的附图和描述中阐述了根据本发明的一个或更多个实施方式的细节。根据这些描述和附图,并且根据权利要求,其它特征将更加明显。

#### 附图说明

[0017] 附图被包括进来以提供对本发明的进一步理解,其被并入且构成本说明书的一部分,附图示出了本发明的实施方式,并与说明书一起用于解释本发明的原理。在附图中:

[0018] 图1是根据本发明一个实施方式的视频会议系统的结构。

[0019] 图2至5示出了根据本发明一个实施方式的发送用户终端的显示器上正在显示的用户显示的一部分的方法。

[0020] 图5是示出了根据本发明一个实施方式的VCS中的所选择区域的数据发送方法的流程图。

[0021] 图6是根据本发明一个实施方式的用于显示用户在用户终端10上选择的区域的图像的终端结构。

[0022] 图7至9示出了根据本发明一个实施方式的向用户提供要发送到另一方的图像的反馈的方法。

[0023] 图10是示出根据本发明一个实施方式的在将用户选择区域的图像发送到另一方之前或之后向用户提供反馈信息的方法的流程图。

[0024] 图11是根据本发明一个实施方式的如果用户选择区域的图像包括文本则基于用户选择仅发送文本的VCS的结构。

[0025] 图12示出根据本发明一个实施方式的当内容画面中的用户选择区域中存在文本



时确定是否仅向用户发送文本或图像的用户画面。

[0026] 图 13 是示出根据本发明一个实施方式的当在内容画面上显示的图像的用户选择区域中存在文本时仅提取并发送文本的方法的流程图。

### 具体实施方式

[0027] 现在将详细描述本发明的优选实施方式,在附图中示出了其示例。只要有可能,就在全部附图中使用相同的参考数字表示相同或类似的部件。

[0028] 此后,将参考附图更详细描述本发明的实施方式。

[0029] 图 1 是根据本发明一个实施方式的视频会议系统 (VCS) 的结构。视频会议系统的所有部件都得到有效连接和配置。

[0030] 参考图 1,发送端的用户终端 10 和接收端的另一方终端 20 通过诸如因特网、专用通信网或者其它网络的传输介质而相互交换数据。终端 10 和 20 可以是计算机、输入板 (tablet)、电视、移动终端、手机、智能手机、多媒体装置等。终端 10 和 20 可以是相同类型或不同类型的装置。

[0031] 用户终端 10 包括显示器 15、区域选择单元 11、缩放器 12、图像压缩单元 13、以及网络单元 14。显示器 15 向用户终端 10 处的用户显示视频会议图像。区域选择单元 11 从在显示器 15 的画面上显示的图像中剪切出选择的区域,并将所选择区域的图像作为附加图像临时存储在存储器中。存储器可以是终端 10 中的或者与终端 10 相关联的任何存储单元。缩放器 12 修改所选择区域的图像的分辨率和尺寸以使其适合另一方终端的显示器,从而产生缩放后的图像。图像压缩单元 13 压缩缩放后的图像。网络单元 14 经由传输介质发送压缩后的图像,并从另一方终端 20 接收预定数据,所述传输介质可以是通信网络、类似蓝牙的短距离或近场网络等。

[0032] 另一方终端 20 包括从用户终端 10 接收图像的网络单元 23、对所接收的图像进行解压缩并对图像进行处理的图像解压缩单元 22、以及基于处理后的图像显示视频会议图像的显示器 21。此外,另一方终端 20 可包括用于视频会议的显示单元。各个终端 10 和 20 可进一步包括用来捕捉相互发送的图像的摄像机。即,对于视频会议或其它用途,在用户终端 10 中进行的任何操作 (例如,图像捕捉、图像发送、图像接收、区域选择、缩放等) 可以在另一方终端 20 中执行,反之亦然。

[0033] 图 1 的视频会议系统用于从用户终端 10 向另一方终端 20 发送视频会议图像。由于在视频会议中实际上可以有多于两个的用户交换图像,所以用户终端 10 包括用于接收会议图像的配置单元,而另一方终端 20 包括用于发送图像的配置单元。此外,用于进行视频会议图像发送和接收的用户终端 10 和另一方终端 20 可以具有相同的结构。

[0034] 此外,可以通过一个专用处理器芯片或通用处理器来执行用户终端 10 和另一方终端 20 的部件功能,并且用户终端 10 和另一方终端 20 可以进一步包括用于处理器操作或其它操作的存储器或其它存储单元。

[0035] 图 2 示出根据本发明一个实施方式的 VCS 中的用户终端 10 的显示器 15 的用户画面 110 的示例。可以在画面 110 的一侧安装摄像机 111,以捕捉用户的图像。例如,用户终端 10 中可以包括摄像机,或者可以使用独立的 (可拆卸的) 摄像机。摄像机 111 可以安装在能够捕捉用户或者任何其它期望目标的图像的任何地方。

[0036] 用户画面 110 可包括用于表示用户端信息或者另一方信息的多个窗口。更详细地说,用户画面 110 可以包括用于显示另一方图像的另一方图像画面 / 窗口 112,用于显示用户端图像的用户图像画面 / 窗口 113,以及用于显示用户端的内容的用户内容画面 / 窗口 114。例如,另一方图像画面 112 可以显示从终端 20 向用户终端 10 发送的在另一方终端 20 的用户或任何期望目标的图像(例如,在终端 20 处摄像机捕捉的图像)。用户图像画面 113 显示在终端 10 处由摄像机 111 捕捉的图像。内容画面 114 是用于与另一方终端 20 处的另一方一起共享诸如文档、文本、视频、文件等的多媒体数据的窗口。用户内容画面 114 可以是用于除了显示用户端正在发送的图像之外还显示将要发送到在终端 20 处的另一方的多媒体数据的画面,因此,可以显示诸如文字处理器、幻灯片演示(power point)、PDF 文件的各种格式的文档,还可以显示视频(例如,运动图像、静止图片等)。用户播放连接到用户终端 10 的 PC 或数据库中的内容,并显示它们,并且将用户内容画面 114 上的显示图像发送到另一方终端 20。

[0037] 根据实施方式,可以在终端 10 的画面 110 上提供其它窗口(另一方内容画面),其显示来自另一方的内容(例如,文档、PDF 文件等)。

[0038] 此外,尽管在上述示例中用户与一方进行视频会议,但是用户也可以与多方进行视频会议。在这种情况下,画面 110 可以对于各方都包括上述多个窗口(112、113 和 114 等)。

[0039] 作为变形,用户终端 10 处的用户可以选择另一方图像画面 112、用户图像画面 113,以及用户内容画面 114 中的一个或更多个以将其包括在用户画面 110 上。例如,用户可以根据用户偏好来配置画面 110 的显示方式。这种情况下,仅在用户画面 110 上显示所选择的画面。例如,用户可以安排仅显示另一方图像画面 112 或者仅显示另一方图像画面 112 和另一方内容画面(例如图 9 中的 124)。

[0040] 根据现有技术,如果使用常规技术将用户内容画面上显示的图像原样发送到另一方终端,那么,由于另一方终端的显示器的最优分辨率和图像尺寸与该用户终端的显示器的最优分辨率和图像尺寸不同,所以可能不能将图像显示在用户内容画面上一样显示在另一方终端上,并且出现观看的问题。尤其是,如果用户终端的显示器具有较高的性能规格,那么,即使发送在用户内容画面上显示的图像,也不能在另一方终端的显示器上恰当地进行显示。此外,如果发送整个内容画面,则由于还发送了不需要的部分,所以浪费了资源。

[0041] 本发明解决了现有技术的这些局限。根据本发明,用户终端 10 的用户从用户内容画面 114 选择要进行发送的区域。在图 2 中,如果从内容画面 114 用字母 / 文本选择了部分区域 115,则仅向另一方终端 20 发送所选择的区域 115。即,选择图 3 中所示的图像,并将其从当前显示在内容画面 114 上的图像中剪切出来然后进行复制,然后,将剪切图像的副本发送到另一方终端 20,以在其中进行存储和 / 或进行显示。无论此操作的情况如何,在内容画面 114 上显示的图像都可以连续显示。如果用户知道另一方终端 20 的显示器 21 的规格低于用户终端 10 的显示器 15 的规格,则选择用户希望发送到另一方的一部分图像,然后进行发送。

[0042] 通过缩放器 12 对选择区域 115 的图像进行缩放以适应另一方显示器 15 的图像尺寸和分辨率,并且通过图像压缩单元 13 对其进行压缩,然后利用网络单元 14 将其发送到另一方终端 20。关于这一点,可以从另一方终端 20 发送有关另一方显示器 21 的信息(例如,

有关对于另一方显示器 21 最优的分辨率和图像尺寸的信息),作为视频会议开始之前提供的系统信息的一部分。

[0043] 根据一个实施方式,当从另一方终端 20 接收了有关另一方显示器 21 的信息时,可以将其显示在用户终端 10 的用户画面 110 上。可以由终端 10 的用户选择是否显示另一方的显示器信息。

[0044] 根据一个实施方式,如图 4 所示,用户内容画面 114 显示指示符 116,该指示符 116 显示对于另一方显示器 21 最优的选择区域的尺寸。可以以很多不同的方式显示指示符 116,例如,当用户选择指定的指示符按钮/按键时,当用户在用户内容画面 114 上进行双击时,等等。终端 10 的用户可以移动指示符 116,以对用户希望发送到另一方的部分进行定位。例如,终端 10 的用户可以增大或减小指示符 116 的尺寸,并且/或者可以在画面 114 上沿任何方向移动指示符 116,以选择所显示图像的任何期望部分。这可以利用终端 10 的输入单元来完成,例如鼠标、遥控器、控制面板/控制台、键盘、软键等。一旦完成了指示符 116 的定位,用户就例如通过在指示符 116 上进行点击/选择等,来选择属于适当定位/定尺寸的指示符 116 的内容。将用户内容画面 114 的这个选中部分(包括其中显示的内容)指定为用户选择区域。然后,可以对用户选择区域进行缩放和/或图像压缩以及用于另一方终端 20 的任何其它处理,然后,例如经由网络单元 14 或者其它装置向另一方终端 20 发送经过处理的用户选择区域,然后将其在显示器 21 进行显示。可以基于用户的选择/命令将指示符 116 设置为不可见。

[0045] 根据一个实施方式,如果利用指示符 116 来选择将要按照针对另一方显示器 21 最优的分辨率和图像尺寸进行发送的区域,则可以省略缩放器 12 的缩小处理。

[0046] 结果,根据本发明,另一方终端 20 处的用户可以观看终端 10 处的用户为视频会议选择的图像。此操作可以按许多方式用于视频会议。例如,在视频会议期间,终端 10 处的用户可以仅仅将用户显示器 15 上当前显示的全部图像/内容的适当部分发送到另一方,以得到更集中的讨论和关注。其进一步减少了视频会议期间的数据传输时间量,这继而减少了等待时间量和视频会议时间量。此外,终端 10 处的用户能够控制另一方可以观看到什么信息。

[0047] 图 5 是示出了根据本发明一个实施方式的 VCS 中的画面的选择区域的数据发送方法的流程图。可以在图 1、6 或 11 的 VCS 中或者在本文讨论的本发明的任何其它 VCS 中实现图 5 的方法以及本文中讨论的本发明的任何其他方法。

[0048] 参考图 5,一旦在操作 S101 中启动 VCS,则在操作 S102 中在用户终端的用户显示器(例如,15)上显示内容画面(例如,用户内容画面 114),以便与另一方共享文档或者诸如视频的多媒体数据。如果用户终端处的用户在操作 S103 中选择内容画面的区域,则在操作 S104 中剪切并复制所选择的区域,并将所选择区域的副本作为附加图像存储在用户终端的存储器中。在操作 S105 中缩小剪切的图像/区域,并在操作 S106 中对其进行压缩,然后在操作 S107 中将其发送到另一方终端(例如,20)以进行诸如显示、编辑、存储、复制、传输、记录等的任何处理。根据一个实施方式,如果用户选择的区域具有对于另一方显示器(例如,21)最优的尺寸,则可以省略用户终端处的缩放。

[0049] 根据一个实施方式,在发送到另一方之前,可以在用户终端显示用户终端处的用户希望发送的所选择区域的图像(例如,用于用户终端处的用户进行检验)。

[0050] 图 6 是根据本发明一个实施方式的用于显示用户在用户终端 10 上选择的画面/窗口的区域的图像的终端结构。除了将缩放器 12 的输出(反馈)以及图像输入发送到显示器 15 并在其上进行显示之外,此实施方式大致与图 1 的实施方式相同。图 6 的 VCS 的所有部件都得到了有效连接及配置。

[0051] 根据以上结构,如图 7 所示,当用户(例如,终端 10 处的用户)选择区域 115 时,可以在显示器 15 的用户画面之一(例如,用户图像画面 113)上的弹出窗口中显示所选择区域的图像 117。通过这样做,用户可以接收关于是否恰当选择了要发送的图像的反馈。

[0052] 根据一个实施方式,在发送了用户选择区域 117 的图像之后,再次从另一方终端 20 接收关于正在另一方显示器 21 上显示的状态的信息,然后将其显示在用户端画面上。例如,因为在用户显示器 15 上显示正在另一方显示器 21 上显示的图像,所以可以提供所希望的关于是否在另一方显示器 21 上恰当显示了用户选择区域的图像的反馈。

[0053] 另一方终端 20 接收用户选择区域 17 的图像,然后将其显示在显示器 21 上。关于在另一方显示器上对于用户选择区域图像 17 的显示状态的信息可以是在显示器 21 处的上述显示画面的捕捉图像。

[0054] 如图 8 所示,可以在用户终端 10 的另一方图像画面 112 上的弹出窗口(117)中显示从另一方终端 20 接收的反馈信息(即,关于另一方显示器 21 上正在显示的图像的信息)。作为变形,当用户显示器 15 如图 9 所示地单独显示另一方内容画面 124(即,用于显示正在显示器 21 上显示的内容的画面)时,可以在另一方内容窗口 124 上的弹出窗口(117)中显示反馈信息。

[0055] 图 10 是示出根据本发明一个实施方式的提供反馈信息的方法的流程图,所述反馈信息关于在将用户选择区域的图像发送到另一方之前是否恰当选择了用户发送的图像、以及在发送图像之后是否在另一方显示器上恰当显示了图像。可以在图 6 的 VCS 中实现图 10 所示的方法。

[0056] 参考图 6,一旦在操作 S201 中启动了 VCS,就在操作 S202 中在用户终端(例如,10)上显示包括内容画面(例如,114)的用于视频会议的画面。在操作 S203 中,当用户从内容画面中选择了预定区域时,在操作 S204 中在用户显示器(例如,15)的弹出窗口中显示用户选择的区域。一旦用户确认了用户选择区域的图像并确定了将其发送,则在操作 S205 中剪切并复制用户选择区域,然后将副本另外存储在用户终端的存储器中。在操作 S206 中缩小用户选择区域以使其适于另一方的显示器,并在操作 S207 中进行压缩。然后,在操作 S208 中向另一方终端(例如,20)发送压缩后的图像。在操作 S209 中,在用户终端的显示器 15 上显示另一方终端 20 从用户终端 10 接收的图像,然后,再次向用户终端发送所捕捉的显示图像,如图 7 至 9 所示。然后,如图 8 至 9 所示,在操作 S210 中,在显示器 15 上显示所接收的反馈图像。用户确认反馈图像,如果有问题,则再次发送相同的图像,或者从用户终端 10 向另一方终端 20 发送具有不同尺寸的图像。

[0057] 根据一个实施方式,如果在视频会议期间用户希望发送给另一方的图像主要包括文本,那么,仅仅提取文本,然后进行发送。于是,相比图片或视频,文本具有明显小得多的数据传输量,从而可以显著减少视频会议的数据传输所消耗的资源。

[0058] 图 11 是根据本发明一个实施方式的如果用户选择区域的图像包括文本则基于用户选择仅发送文本的 VCS 的结构。图 11 的 VCS 与图 1 和 6 所示的 VCS 类似,但是可以进一



步包括用于单独处理文本的单元。图 11 的 VCS 的所有部件都得到有效连接和配置。

[0059] 如图 11 和 12 所示,用户终端 30 包括显示器 28、区域剪切单元 21、文本确定单元 25、文本提取单元 26、以及文本压缩单元 27。显示器 28 向用户终端 30 处的用户显示图像(如另一方的图像和/或内容、用户的内容和/或图像等)。区域选择单元 21 剪切出用户从显示在显示器 28 的画面 310 上的画面/窗口 112、113、114 等之中的用户内容画面 114 中选择的区域,对其进行复制,然后将剪切区域的副本作为附加图像临时存储在用户终端 30 的存储器中。文本确定单元 25 确定在用户选择区域中是否包括文本。如果确定了在用户选择区域中存在文本,则在用户确定了向另一方仅发送文本之后,文本提取单元 26 从用户选择区域中提取文本。文本压缩单元 27 压缩所提取的文本,或者将所提取的文本转换为用于传输的格式。另外,如果用户确定了发送图像(即,不是仅仅发送文本,而是发送可能包括图片、文本等的全部内容),那么,即使用户选择区域中包括文本或者用户选择区域中没有文本,用户终端 30 也包括:缩放器 22,其用于按对于另一方显示器 41 最优的分辨率和图像尺寸对选择的图像进行缩放;图像压缩单元 23,其用于对缩放后的图像进行压缩,并将其转换为适于传输的格式;以及网络单元 24,其用于发送图像或文本。

[0060] 另一方终端 30 包括用于接收图像和/或文本的网络单元 43、用于将图像/文本处理为可输出格式的图像和文本解压缩单元 42、以及用于输出经过处理的图像和/或文本的显示器 41。如图 1 或 6 中所示,图 11 是根据本发明一个实施方式的用于将用户从用户终端 30 中选择的区域的图像发送到另一方终端 40 的结构。然而,用户终端 30 和另一方终端 40 互相发送和接收数据,从而它们的结构可以相同。此外,可以通过专用处理器或通用处理器/控制器来执行上述部件的功能。即,图 1、6 和 11 的各个终端包括控制该终端的所有部件的操作的处理器/控制器。

[0061] 图 12 示出显示器 28 的用户画面 310 的示例,该用户画面 310 用于确认当内容画面 114 的用户选择区域中存在文本时是否向另一方仅发送文本还是向另一方发送图像。如图 12 所示,如果文本确定单元 25 确定了用户为传输而选择的用户选择区域 115 中存在文本,则向用户显示询问用户是发送用户选择区域 115 中的图像还是仅发送文本的消息 131。如果用户终端 30 的用户选择了“是”(例如,仅发送文本),则仅从用户选择区域 115 中提取文本,然后向另一方终端 40 仅发送所提取的文本,以进行诸如显示、再现、编辑、记录等的各种处理。接收到文本的另一方终端 40 可以在视频会议期间或之前以适当的格式在显示器 41 上显示该文本。另一方面,如果用户终端 30 的用户选择“否”(例如,发送用户选择区域的全部内容),则使用部件 22 至 24,根据图 1 和 6 所示的方法,对图像(即,用户选择区域的全部图像)进行选择、处理并发送到另一方终端 40。

[0062] 根据上述结构,当用户在视频会议期间希望从用户终端发送到另一方终端的图像仅包括文本时,传输数据量或者传输时间长度都可以得到显著降低。

[0063] 图 13 是示出根据本发明一个实施方式的当用户内容画面上显示的图像的用户选择区域中存在文本时仅提取并发送文本的方法的流程图。可以在图 11 的 VCS 中实现图 13 所示的方法。

[0064] 参考图 13,在操作 S301 中启动 VCS,在操作 S302 中在用户画面(例如,310)上显示各种画面 112、113、114(并且可能有类似 124 的另一方内容画面)。如果用户终端 30 的用户在操作 S303 中在用户内容画面 114 上选择一区域以与另一方共享,则在操作 S304 中,

文本确定单元 25 确定所选择的区域是否包括文本。如果在用户选择区域中存在文本,则在操作 S305 中,通过向用户显示消息(例如,131)来确认是否仅发送文本。如果用户终端 30 的用户选择仅发送文本,则在操作 S306 中,从用户选择区域中仅提取文本,在操作 S307 中将其压缩并/或转换为对传输最优化的格式,然后在操作 S308 中将其发送到另一方终端 40。

[0065] 如果在操作 S304 中文本确定单元 25 确定了用户选择区域中不存在文本,或者如果在操作 S305 中用户选择发送用户选择区域的全部图像,则在操作 S309 中,剪切全部的用户选择区域并将其作为附加图像存储在用户终端 30 中。然后,在操作 S310 中,按照对于另一方显示器 41 最优化的分辨率和尺寸缩小所存储的附加图像。接着,在操作 S311 中将缩放后的图像压缩为适于传输的格式,然后在操作 S312 中将其发送到另一方终端 40,以进行显示、记录、存储、再现、编辑、共享等。

[0066] 在图 1、6 和 11 的 VCS 中,部件之间的方向箭头仅是示例,VCS 的所有部件都可以根据需要提供相互双向通信。此外,控制器可以控制各个终端中的这些部件的操作。此外,一个实施方式的特征可以应用于其它实施方式。例如,图 1 所示的指示符 116 同样可以应用于图 6 和 11 所示的 VCS。

[0067] 根据本发明的实施方式,当用户希望对于视频会议或者在视频会议期间与一方或更多方相互共享数据时,仅仅用户选择的数据部分按照针对其他方的显示器最优化的格式来提供,从而可以抵消或者最小化参与视频会议的所有成员的装置之间的性能差异。

[0068] 此外,根据本发明,考虑用户希望共享的数据是否仅包括文本,可以降低传输的数据量或者数据传输时间。

[0069] 尽管已经参考本发明的多个示例性实施方式描述了本发明的实施方式,但是应当理解,本领域技术人员可以设计出落入本发明原理的精神和范围之内的很多其他修改和实施方式。更具体地说,在本公开、附图以及所附权利要求的范围之内,可以就组成部件和/或所考虑的组合安排进行各种变化和修改。除了对组成部件和/或安排的变化和修改之外,对于本领域普通技术人员,另选的用途也是非常明显的。

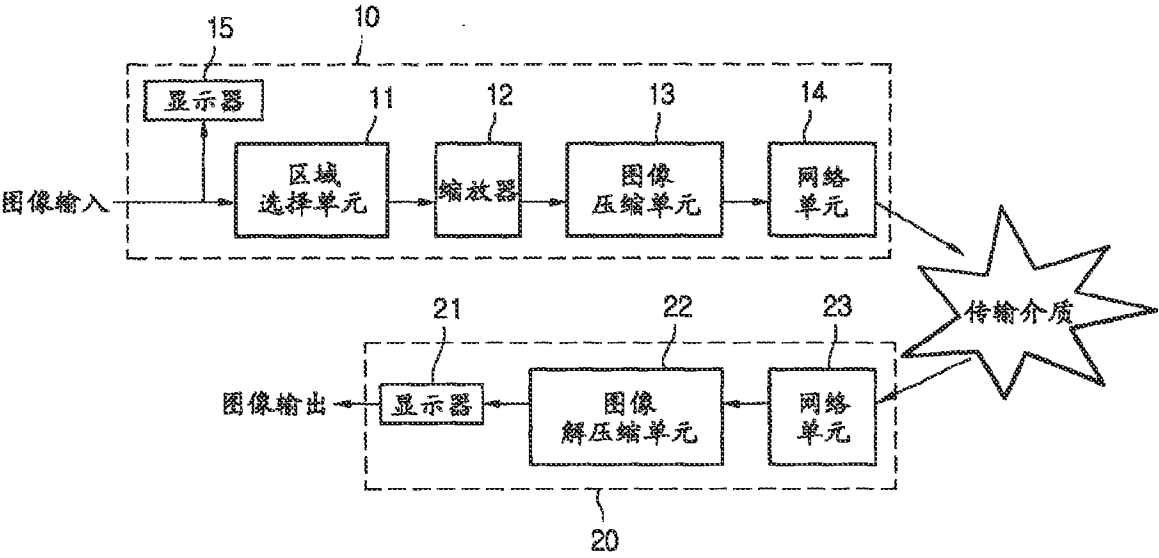


图 1

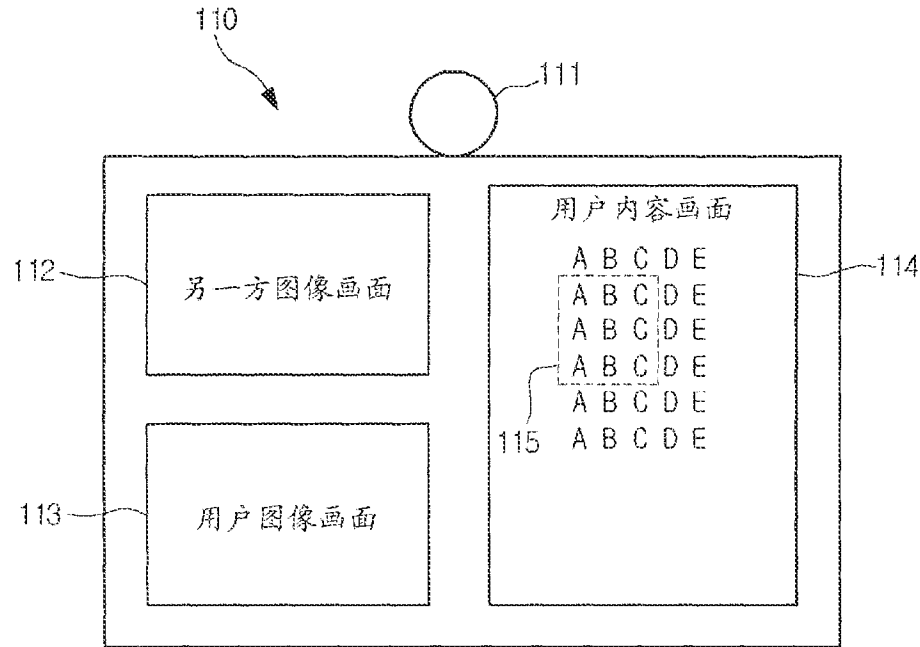


图 2

115

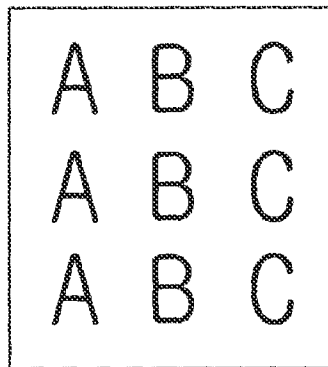


图 3

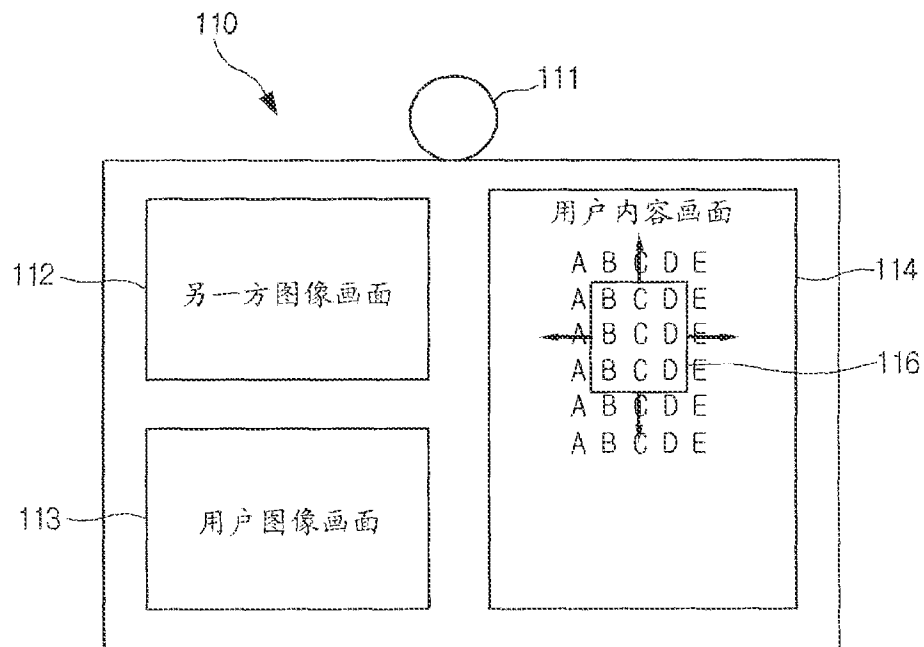


图 4

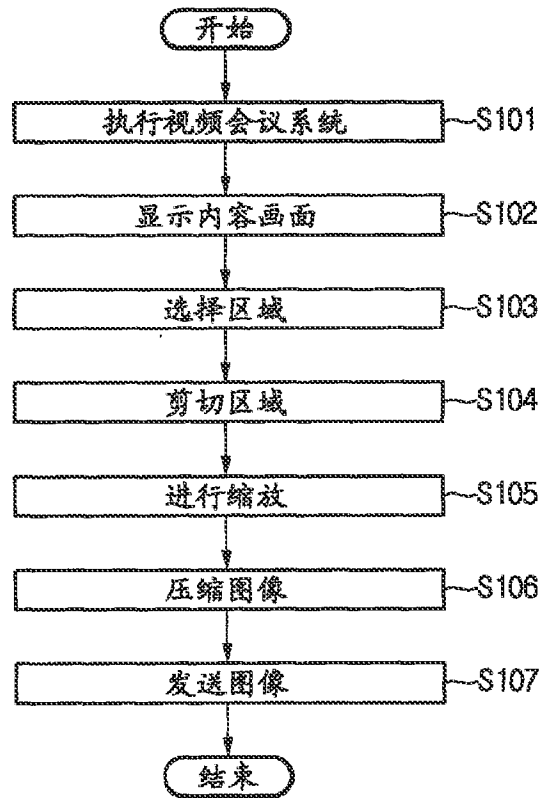


图 5

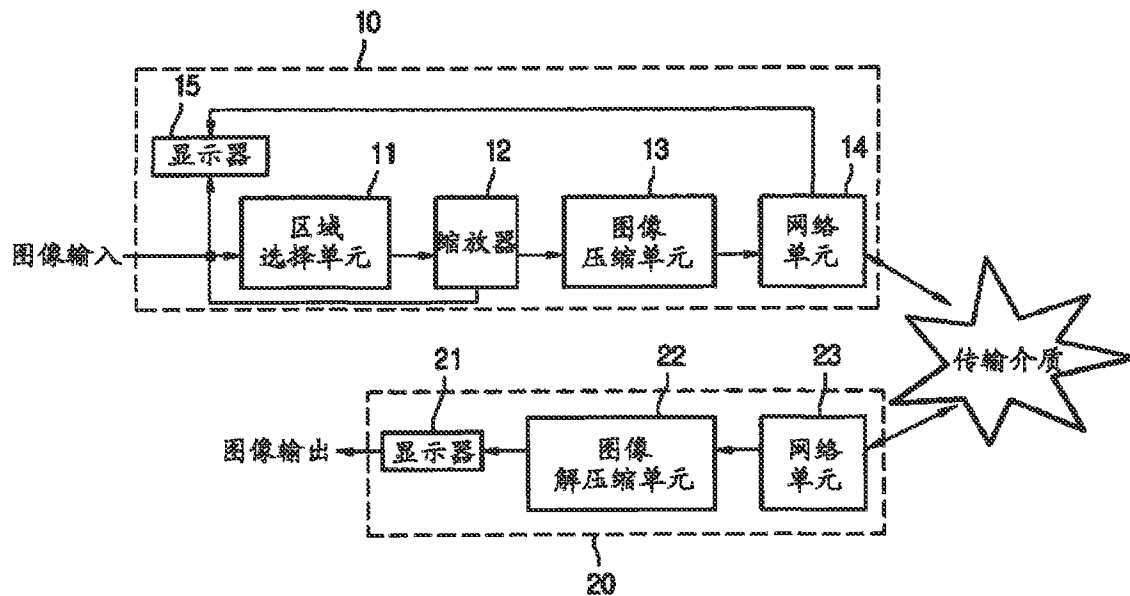


图 6

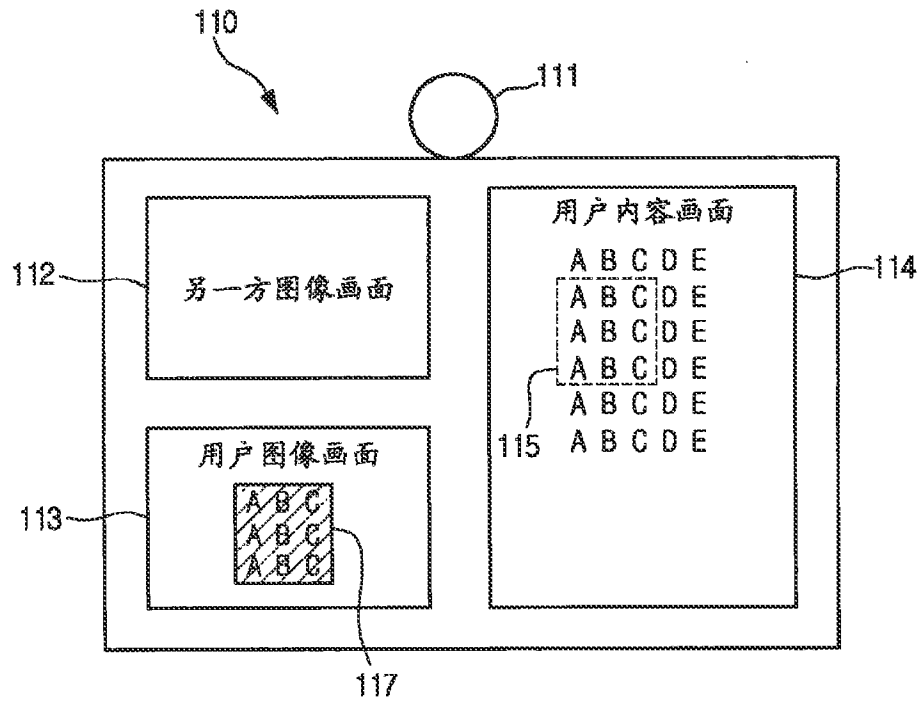


图 7

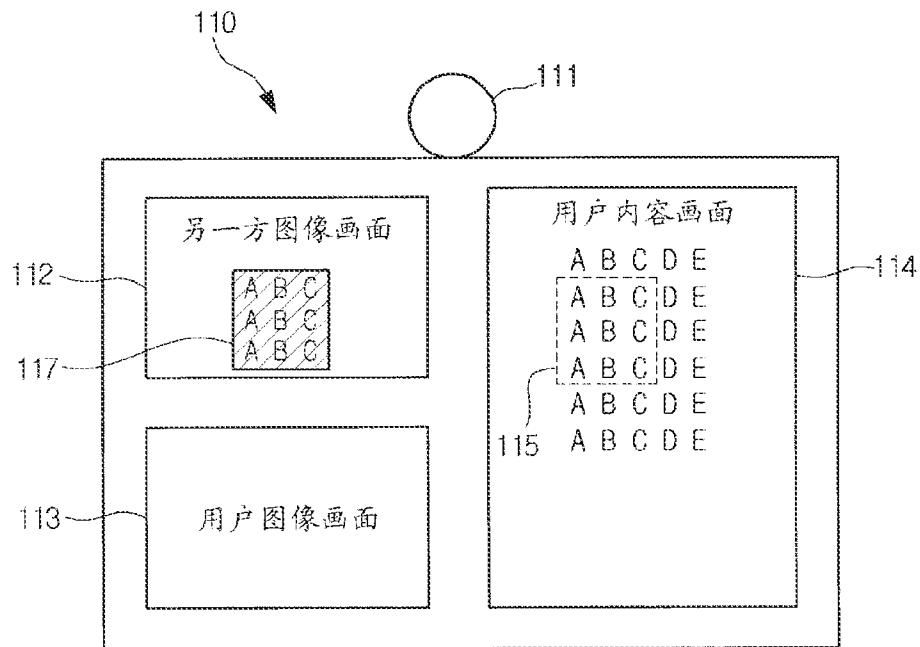


图 8

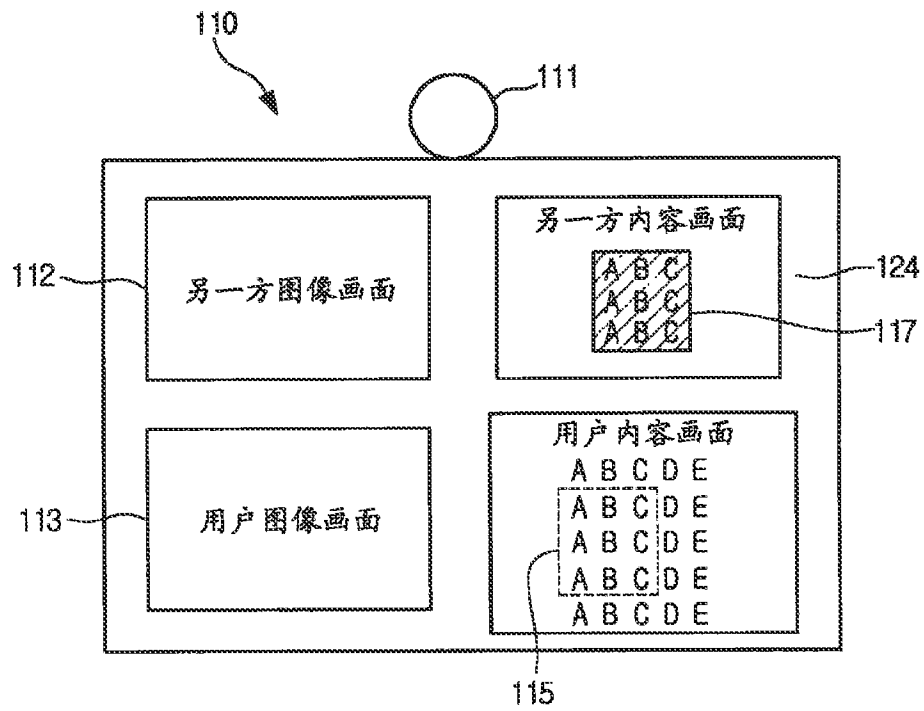


图 9

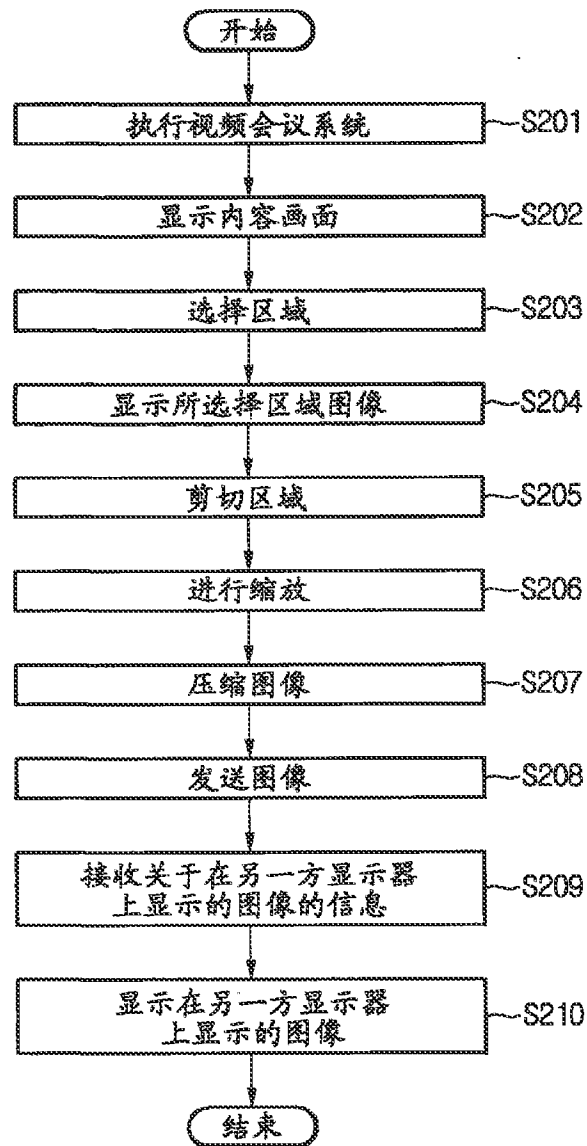


图 10



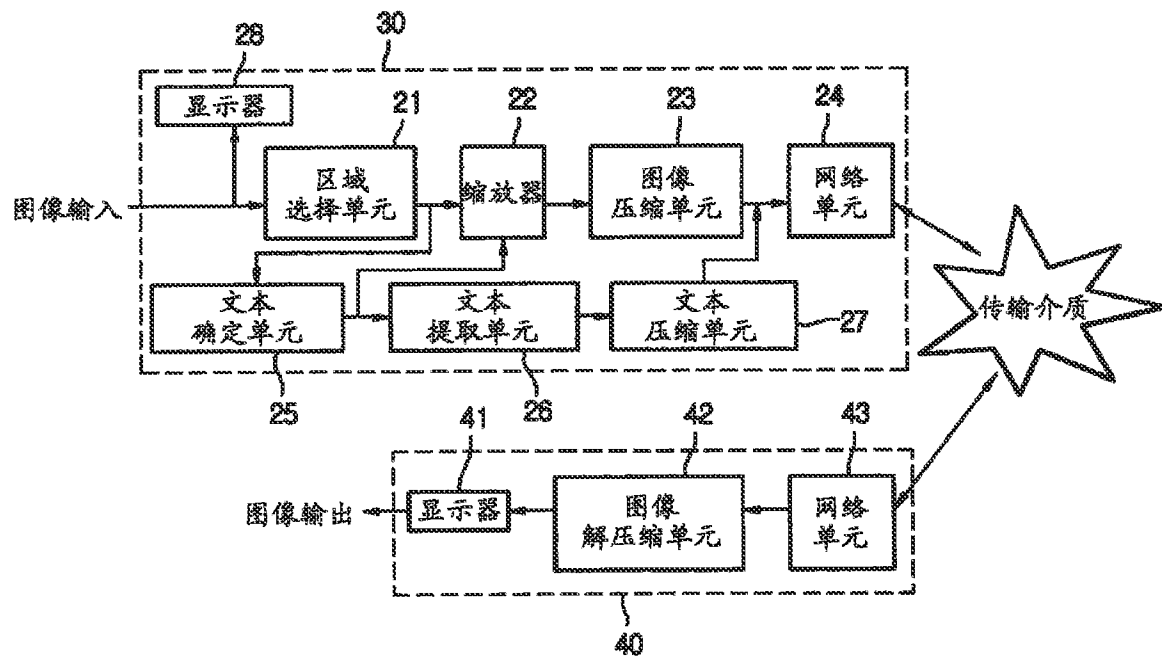


图 11

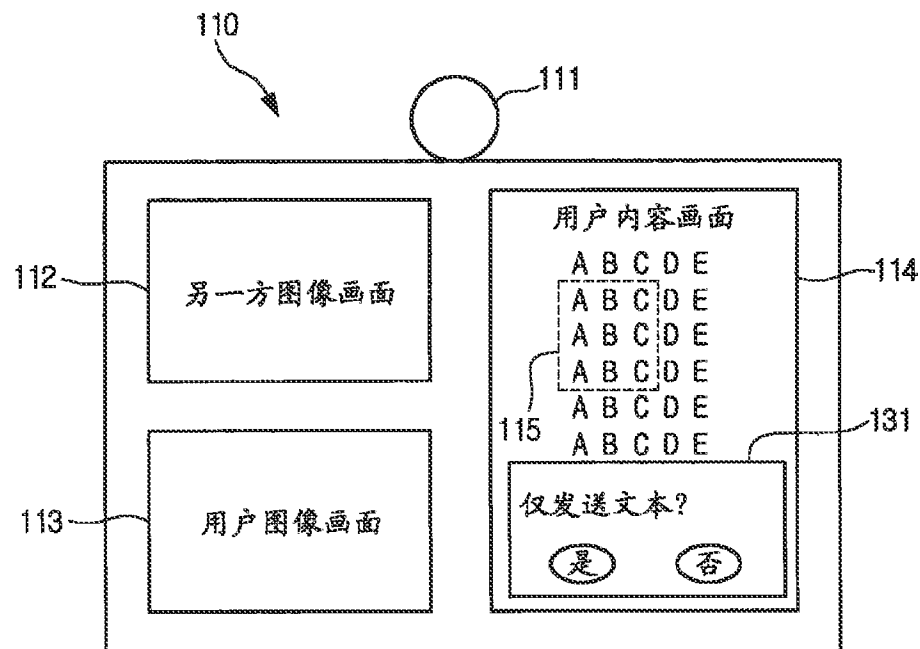


图 12

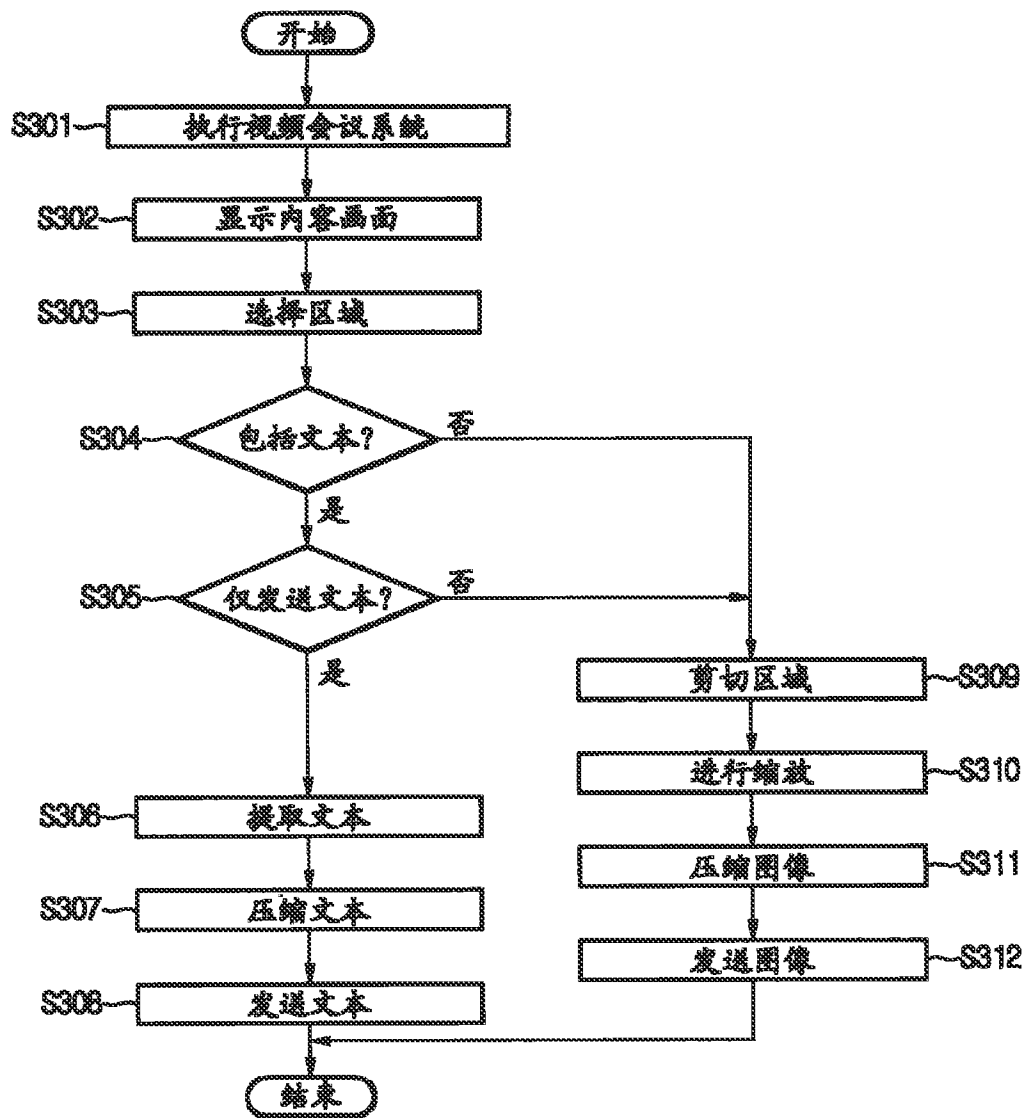
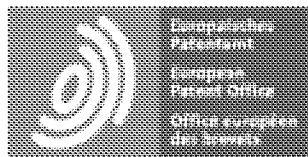


图 13



# Espacenet

CN101572794A Conference terminal, conference server, conference system and data processing method

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Conference terminal, conference server, conference system and data processing method

Abstract

The embodiment of the invention provides a conference terminal, a conference server, a conference system and a data processing method, wherein, the conference terminal comprises a mark acquisition module for acquiring a marked data signal; an image acquisition module for acquiring an image data signal; a superposing module for superposing the image data signal and the marked data signal to generate a composite image and data signal; and an output module for outputting the composite image and data signal. The conference terminal, the conference server, the conference system and the data processing method can help improve sense of participation of a video conferencing user and enhance the discussion efficiency.

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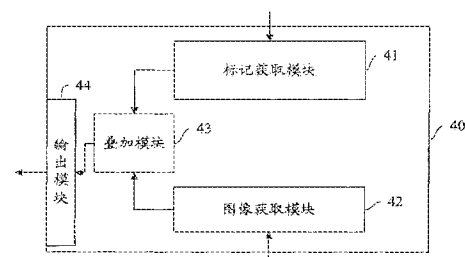
权利要求书 11 页 说明书 32 页 附图 13 页

## [54] 发明名称

会议终端、会议服务器、会议系统及数据处理方法

## [57] 摘要

本发明实施例提供一种会议终端、会议服务器、会议系统及数据处理方法，其中，会议终端包括：标记获取模块，用于获取标记数据信号；图像获取模块，用于获取图像数据信号；叠加模块，用于将所述图像数据信号和所述标记数据信号进行叠加，生成混合图像数据信号；输出模块，用于输出所述混合图像数据信号。通过采用本发明的实施例，可以提高视频会议用户的参与感，提高讨论效率。



1. 一种会议终端，其特征在于，包括：  
标记获取模块，用于获取标记数据信号；  
图像获取模块，用于获取图像数据信号；  
叠加模块，用于将所述图像数据信号和所述标记数据信号进行叠加，生成混合图像数据信号；  
输出模块，用于输出所述混合图像数据信号。
2. 根据权利要求1所述的会议终端，其特征在于，还包括：  
第一定时器，用于产生第一时间间隔值；  
第二定时器，用于产生第二时间间隔值；  
所述标记获取模块具体包括：  
第一标记获取模块，用于获取所述标记数据信号，并按照所述第一时间间隔值输出所述标记数据信号，产生第一标记数据信号；  
第二标记获取模块，用于获取所述标记数据信号，并按照所述第二时间间隔值输出所述标记数据信号，产生第二标记数据信号。
3. 根据权利要求2所述的会议终端，其特征在于，  
所述第一标记获取模块具体为：  
第一内部标记获取模块，用于获取本地会议终端发送的标记数据信号，并按照所述第一时间间隔值输出所述标记数据信号，产生第一标记数据信号；  
所述第二标记获取模块具体为：  
第二内部标记获取模块，用于获取本地会议终端发送的标记数据信号，并按照所述第二时间间隔值输出所述标记数据信号，产生第二标记数据信号。
4. 根据权利要求3所述的会议终端，其特征在于，还包括：  
标记编码模块，用于将所述第二标记数据信号进行编码，产生第三标记数据信号；  
标记发送模块，用于通过辅流通道或者自定义通道向会议服务器发送所述第三标记数据信号。

5. 根据权利要求4所述的会议终端,其特征在于,还包括:

第一令牌控制模块,用于在所述辅流通道中申请会场令牌,申请成功并得到一会场令牌后,产生第一控制信号;

所述标记发送模块根据所述第一控制信号通过所述辅流通道向所述会议服务器发送所述第三标记数据信号。

6. 根据权利要求2所述的会议终端,其特征在于,

所述第一标记获取模块具体为:

第一外部标记获取模块,用于获取会议服务器发送的除本地会议终端外的至少一个其他会议终端的标记数据信号,并按照所述第一时间间隔值输出所述标记数据信号,产生第一标记数据信号。

7. 根据权利要求6所述的会议终端,其特征在于,

所述第一外部标记获取模块包括:

第一外部标记获取子模块,用于获取所述会议服务器发送的至少一个所述其他会议终端的标记数据信号;

至少一个解码器,用于对所述至少一个所述其他会议终端的标记数据信号分别进行解码,生成一标记数据信号队列;

标记输出模块,用于按照所述标记数据信号队列的顺序输出所述标记数据信号,生成至少一个第一标记数据信号。

8. 根据权利要求7所述的会议终端,其特征在于,

所述叠加模块具体为:

第一叠加模块,用于将所述图像数据信号和所述第一标记数据信号进行叠加,生成第一混合图像数据信号;

所述输出模块具体为:

第一发送模块,用于向本地会议终端的显示屏幕上发送所述第一混合图像数据。

9. 根据权利要求3所述的会议终端,其特征在于,还包括:

第二令牌控制模块,用于在辅流通道中申请会场令牌,申请成功并得到一会场令牌后,产生第二控制信号。

10. 根据权利要求 9 所述的会议终端，其特征在于，

所述叠加模块具体为：

第二叠加模块，用于根据所述第二控制信号将所述图像数据信号和所述第一标记数据信号进行叠加，生成第二混合图像数据；

所述输出模块具体为：

第二发送模块，用于向所述本地会议终端的显示屏幕上发送所述第一混合图像数据，或者通过所述辅流通道向会议服务器发送所述第二混合图像数据。

11. 根据权利要求 3 所述的会议终端，其特征在于，还包括：

令牌管理模块，用于接收本地会议终端所在会场中的一输入设备的子令牌申请，确认所述子令牌申请成功后，分配一子令牌给所述输入设备；

所述第一内部标记获取模块根据所述子令牌，获取所述本地会议终端所在会场中的所述输入设备的标记数据信号，并按照所述第一时间间隔值输出所述标记数据信号，产生第一标记数据信号；

所述第二内部标记获取模块根据所述子令牌，获取所述本地会议终端所在会场中的所述输入设备的标记数据信号，并按照所述第二时间间隔值输出所述标记数据信号，产生第二标记数据信号。

12. 根据权利要求 1 所述的会议终端，其特征在于，

所述标记获取模块具体为：

实时标记获取模块，用于实时获取标记数据信号；

所述图像获取模块具体为：

实时图像获取模块，用于实时获取图像数据信号。

13. 根据权利要求 1 所述的会议终端，其特征在于，

所述标记获取模块具体为：

手动标记获取模块，用于提供手动接收选项，所述手动接收选项被选择时，获取标记数据信号；

所述图像获取模块具体为：

手动图像获取模块，用于提供手动接收选项，所述手动接收选项被选择时，获取图像数据信号。



14. 根据权利要求 1-13 任一项所述的会议终端, 其特征在于, 还包括:  
私密令牌控制模块, 用于接收本地会议终端所在会场中的一输入设备发起的与一目标输入设备进行私密会议的私密令牌申请, 确认所述私密令牌申请成功后, 启用一辅流通道或者自定义通道, 并分配一私密令牌给所述输入设备。

15. 一种会议服务器, 其特征在于, 包括:  
图像数据接收模块, 用于接收会议终端发送的图像数据信号;  
标记接收模块, 用于接收会议终端发送的标记数据信号;  
叠加模块, 用于对所述图像数据信号和所述标记数据信号进行叠加, 生成混合图像数据;  
发送模块, 用于发送所述混合图像数据或者所述图像数据信号或者所述标记数据信号。

16. 根据权利要求 15 所述的会议服务器, 其特征在于, 所述叠加模块包括:

填充模块, 用于为所述标记数据信号分配填充颜色或者透明颜色, 并利用所述填充颜色或者透明颜色对所述标记数据信号进行处理, 产生颜色标记数据信号;

处理模块, 用于将所述图像数据信号和所述颜色标记数据信号进行叠加, 生成混合图像数据。

17. 根据权利要求 15 或 16 所述的会议服务器, 其特征在于, 还包括:  
发送控制模块, 用于选择辅流通道, 控制所述发送模块通过所述辅流通道向会议终端或者其他会议服务器发送所述混合图像数据或者所述图像数据信号或者所述标记数据信号。

18. 根据权利要求 17 所述的会议服务器, 其特征在于, 还包括:  
令牌管理模块, 用于接收会议终端发起的会场令牌申请, 确认所述会场令牌申请成功后, 向所述会议终端返回一会场令牌;

所述发送控制模块根据所述会场令牌, 选择辅流通道, 控制所述发送模块通过所述辅流通道向其它会议终端或者其他会议服务器发送所述混合图像数据或者所述图像数据信号或者所述标记数据信号。



19. 一种会议系统，其特征在于，包括：第一会议终端，会议服务器和至少一个第二会议终端；其中，

所述第一会议终端包括：

图像获取模块，用于获取所述会议服务器转发的图像数据信号；

标记发送模块，用于获取标记数据信号，并向所述会议服务器发送标记数据信号；

所述会议服务器包括：

图像数据接收模块，用于接收系统中任一会议终端发送的图像数据信号；

标记接收模块，用于接收所述标记数据信号；

叠加模块，用于对所述图像数据信号和所述标记数据信号进行叠加，生成混合图像数据；

发送模块，用于向所述第一会议终端和所述至少一个第二会议终端发送所述混合图像数据；

所述至少一个第二会议终端，用于接收并显示所述混合图像数据。

20. 根据权利要求 19 所述的系统，其特征在于，所述会议服务器为至少两个级联的会议服务器。

21. 根据权利要求 20 所述的系统，其特征在于，所述至少两个会议服务器包括：一主会议服务器和至少一个从会议服务器；

所述主会议服务器，向所述至少一个从会议服务器和与所述主会议服务器连接的会议终端发送所述混合图像数据；

所述从会议服务器，将其接收到的所述混合图像数据向与所述从会议服务器连接的会议终端发送。

22. 根据权利要求 20 所述的系统，其特征在于，所述至少两个会议服务器均为主会议服务器，所述系统还包括：

控制单元，用于获取所述标记数据信号的发送时间，按照所述标记数据信号的发送时间的先后顺序，产生一控制信号；

所述至少两个主会议服务器中的所述叠加模块，根据所述控制信号对所述图像数据信号和所述标记数据信号进行叠加，生成所述混合图像数据。

23. 根据权利要求 22 所述的系统, 其特征在于, 所述至少两个主会议服务器根据所述控制信号, 获取一控制令牌, 所述叠加模块根据所述控制令牌对所述图像数据信号和所述标记数据信号进行叠加, 生成所述混合图像数据。

24. 一种会议系统, 其特征在于, 包括: 第一会议终端, 会议服务器和至少一个第二会议终端; 其中,

所述第一会议终端包括:

图像获取模块, 用于获取所述会议服务器发送图像数据信号;

标记发送模块, 用于获取标记数据信号, 并向所述会议服务器发送所述标记数据信号;

所述会议服务器用于接收所述图像数据信号和所述标记数据信号, 并转发;

所述至少一个第二会议终端包括:

第一定时器, 用于产生第一时间间隔值;

图像获取模块, 用于获取所述会议服务器转发的图像数据信号;

第一外部标记获取模块, 用于获取所述会议服务器转发的标记数据信号, 并按照所述第一时间间隔值输出所述标记数据信号, 产生第一标记数据信号;

第一叠加模块, 用于将所述图像数据信号和所述第一标记数据信号进行叠加, 生成第一混合图像数据信号;

显示模块, 用于显示所述第一混合图像数据信号。

25. 根据权利要求 24 所述的系统, 其特征在于, 所述第一外部标记获取模块包括:

第一外部标记获取子模块, 用于获取所述会议服务器转发的至少一个其他会议终端的标记数据信号;

至少一个解码器, 用于对所述至少一个其他会议终端的标记数据信号分别进行解码, 生成一标记数据信号队列;

标记输出模块, 用于按照所述第一时间间隔值和所述标记数据信号队列的顺序输出所述标记数据信号, 生成至少一个第一标记数据信号。

26. 根据权利要求 24 或 25 所述的系统, 其特征在于, 所述会议服务器为

至少两个级联的会议服务器。

27. 根据权利要求 26 所述的系统, 其特征在于, 所述至少两个会议服务器包括: 一主会议服务器和至少一个从会议服务器;

所述主会议服务器, 向所述至少一个从会议服务器和与所述主会议服务器连接的会议终端发送所述图像数据信号和所述标记数据信号;

所述从会议服务器, 将其接收到的所述图像数据信号或所述标记数据信号向与所述从会议服务器连接的会议终端发送。

28. 根据权利要求 26 所述的系统, 其特征在于, 所述至少两个会议服务器均为主会议服务器, 所述系统还包括:

控制单元, 用于获取所述标记数据信号的发送时间, 按照所述标记数据信号的发送时间的先后顺序, 产生一控制信号;

所述至少两个主会议服务器根据所述控制信号转发所述图像数据信号和所述标记数据信号。

29. 根据权利要求 28 所述的系统, 其特征在于, 所述至少两个主会议服务器根据所述控制信号, 获取一控制令牌, 并根据所述控制令牌对所述图像数据信号和所述标记数据信号进行转发。

30. 一种会议系统, 其特征在于, 包括: 第一会议终端, 会议服务器和至少一个第二会议终端; 其中,

所述第一会议终端包括:

第一定时器, 用于产生第一时间间隔值;

第二定时器, 用于产生第二时间间隔值;

第一内部标记获取模块, 用于获取本地会议终端发送的标记数据信号, 并按照所述第一时间间隔值输出所述标记数据信号, 产生第一标记数据信号;

第二内部标记获取模块, 用于获取本地会议终端发送的标记数据信号, 并按照所述第二时间间隔值输出所述标记数据信号, 产生第二标记数据信号;

第二叠加模块, 用于将所述图像数据信号和所述第一标记数据信号进行叠加, 生成第二混合图像数据;

第二发送模块, 用于向所述本地会议终端的显示屏幕上发送所述第一混合

图像数据，或者通过辅流通道向所述会议服务器发送所述第二混合图像数据；  
所述会议服务器，用于接收所述第二混合图像数据，并转发；  
所述至少一个第二会议终端，用于接收所述第二混合图像数据并显示。

31. 根据权利要求 30 所述的系统，其特征在于，所述第一会议终端还包括：

第二令牌控制模块，用于在另一个辅流通道中申请会场令牌，申请成功并得到一会场令牌后，产生第二控制信号；

所述第二叠加模块根据所述第二控制信号将所述图像数据信号和所述第一标记数据信号进行叠加，生成第二混合图像数据。

32. 根据权利要求 30 或 31 所述的系统，其特征在于，所述会议服务器为至少两个级联的会议服务器。

33. 根据权利要求 32 所述的系统，其特征在于，所述至少两个会议服务器包括：一主会议服务器和至少一个从会议服务器；

所述主会议服务器，向所述至少一个从会议服务器和与所述主会议服务器连接的会议终端发送所述第二混合图像数据；

所述从会议服务器，将其接收到的所述第二混合图像数据向与所述从会议服务器连接的会议终端发送。

34. 一种数据处理方法，其特征在于，包括：

获取图像数据信号；

获取标记数据信号；

将所述图像数据信号和所述标记数据信号进行叠加，生成混合图像数据信号；

输出所述混合图像数据信号。

35. 根据权利要求 34 所述的方法，其特征在于，所述获取标记数据信号的步骤之后还包括：

产生第一时间间隔值；

产生第二时间间隔值；

按照所述第一时间间隔值输出所述标记数据信号，产生第一标记数据信

号;

按照所述第二时间间隔值输出所述标记数据信号,产生第二标记数据信号。

36. 根据权利要求 35 所述的方法,其特征在于,所述获取标记数据信号的步骤具体为:

获取本地会议终端发送的标记数据信号。

37. 根据权利要求 36 所述的方法,其特征在于,所述按照所述第二时间间隔值输出所述标记数据信号,产生第二标记数据信号的步骤之后还包括:

将所述第二标记数据信号进行编码,产生第三标记数据信号;

通过辅流通道向会议服务器发送所述第三标记数据信号。

38. 根据权利要求 37 所述的方法,其特征在于,所述通过辅流通道向会议服务器发送所述第三标记数据信号的步骤具体为:

在所述辅流通道中申请令牌,申请成功并得到一令牌后,产生第一控制信号;

根据所述第一控制信号通过所述辅流通道向所述会议服务器发送所述第三标记数据信号。

39. 根据权利要求 35 所述的方法,其特征在于,所述获取标记数据信号的步骤具体为:

获取会议服务器发送的除本地会议终端之外的至少一个其他会议终端的标记数据信号。

40. 根据权利要求 39 所述的方法,其特征在于,所述获取会议服务器发送的除本地会议终端之外的至少一个其他会议终端的标记数据信号的步骤之后还包括:

对所述至少一个其他会议终端的标记数据信号分别进行解码,生成一标记数据信号队列;

按照所述第一时间间隔值,根据所述标记数据信号队列的顺序输出所述标记数据信号,生成至少一个第一标记数据信号。

41. 根据权利要求 40 所述的方法,其特征在于,所述将所述图像数据信

号和所述标记数据信号进行叠加，生成混合图像数据信号的步骤具体为：

将所述图像数据信号和所述至少一个第一标记数据信号进行叠加，生成第一混合图像数据信号；

所述输出所述混合图像数据信号的步骤具体为：

向本地会议终端的显示屏幕上发送所述第一混合图像数据。

42. 根据权利要求 36 所述的方法，其特征在于，按照所述第一时间间隔值输出所述标记数据信号，产生第一标记数据信号的步骤后还包括：

在辅流通道中申请令牌，申请成功并得到一令牌后，产生第二控制信号；

所述将所述图像数据信号和所述标记数据信号进行叠加，生成混合图像数据信号的步骤具体为：

根据所述第二控制信号将所述图像数据信号和所述第一标记数据信号进行叠加，生成第二混合图像数据；

所述输出所述混合图像数据信号的步骤具体为：

向所述本地会议终端的显示屏幕上发送所述第二混合图像数据，或者通过辅流通道向会议服务器发送所述第二混合图像数据。

43. 根据权利要求 36 所述的方法，其特征在于，所述获取本地会议终端发送的标记数据信号之前还包括：

接收本地会议终端所在会场中的一输入设备的子令牌申请，确认所述子令牌申请成功后，分配一子令牌给所述输入设备；

所述获取本地会议终端发送的标记数据信号的步骤具体为：

根据所述子令牌，获取所述本地会议终端所在会场中的所述输入设备的标记数据信号。

44. 根据权利要求 39 所述的方法，其特征在于，所述获取会议服务器发送的除本地会议终端之外的至少一个其他会议终端的标记数据信号的步骤具体为：

实时或者手动接收所述会议服务器发送来的，除所述本地会议终端之外的至少一个其他会议终端的标记数据信号。

45. 一种数据处理方法，其特征在于，包括：



接收会议终端发送的图像数据信号和标记数据信号;

对所述图像数据信号和所述标记数据信号进行叠加,生成混合图像数据;

向会议终端发送所述混合图像数据或者所述图像数据信号或者所述标记数据信号。

46. 根据权利要求 45 所述的方法,其特征在于,所述对所述图像数据信号和所述标记数据信号进行叠加,生成混合图像数据的步骤包括:

为所述标记数据信号分配填充颜色或者透明颜色,并利用所述填充颜色或者透明颜色对所述标记数据信号进行处理,产生颜色标记数据信号;

将所述图像数据信号和所述颜色标记数据信号进行叠加,生成混合图像数据。

47. 根据权利要求 45 或 46 所述的方法,其特征在于,所述向会议终端发送所述混合图像数据或者所述图像数据信号或者所述标记数据信号的步骤具体为:

选择一辅流通道,通过所述辅流通道向会议终端发送所述混合图像数据或者所述标记数据信号。

48. 根据权利要求 47 所述的方法,其特征在于,所述向会议终端发送所述混合图像数据或者所述图像数据信号或者所述标记数据信号的步骤之前还包括:

接收所述会议终端发起的会场令牌申请,确认所述会场令牌申请成功后,向所述会议终端返回一会场令牌;

所述向会议终端发送所述混合图像数据或者所述图像数据信号或者所述标记数据信号的步骤具体为:

根据所述会场令牌,将所述混合图像数据或者所述图像数据信号或者所述标记数据信号发送给其它会场的会议终端。

## 会议终端、会议服务器、会议系统及数据处理方法

### 技术领域

本发明涉及视频会议系统，特别是指一种会议终端、会议服务器、会议系统及数据处理方法。

### 背景技术

在最早的视频会议中，人们只能通过图像和声音进行交互，后来 H.261 协议允许视频会议的参与者通过活动视频通道传递 4CIF 大小的静止图文，以便参与者之间分享胶片，但是这种分享是通过抢占活动视频通道来实现的，一方面胶片分辨率不高，另一方面传输胶片时会引起活动视频出现停顿。

后来，H.239 标准协议的出现，参与者可以创建一个辅流通道单独传输胶片，而用主流通道来传输活动视频，使得活动视频和胶片传送互不影响。一种典型的应用场景如图 1 所示，会议终端 12 同时接收到摄像机 11 摄入的会议图像和计算机 10 的文件（如 PPT 或 Word 文档），并对摄像机 11 摄入的会议图像和计算机 10 的文件经过视频编码（通常采用 H.263 或者 H.264 等编码标准）后，通过 H.239 协议标准提供的通道将两路视频流同时发送给 MCU（多点控制单元）13，MCU 13 再转发给其他的与会终端 14，终端 14 在接收到两路视频流后，进行解码，即可得出两路不同的视频图像，并在投影仪 16 或者电视机 15 上进行显示。通过这种方式，任意一个与会者都可以向所有人共享自己的文档，实现了一个简单的数据交互。然而，H.239 的这种胶片共享的方式最大缺点是：参与者不能交互，主讲者在对胶片进行阐述时，其它的参与者只能看胶片，不能在胶片上作标记，因此降低了讨论效率，讨论者参与感不强。

针对这种现象，在现有技术中，出现了一种利用在电子白板上做标记，以达到视频会议的参与者相互交互的目的，如图 2 所示，在会议服务器侧放置一台电子白板服务器 20，每一个视频会议终端放置一台电子白板客户端，如客户端 21，客户端 22，客户端 23，客户端 24 和客户端 25 等，这些客户端通常



为一台 PC，有的客户端还可以是会议子系统中的会议服务器或者会议客户机等，所有的客户端都通过网络连接在到该电子白板服务器 20 上，该电子白板服务器 20 启动一个电子白板，该电子白板可以是空白背景，也可以以图片或者胶片作为背景；电子白板服务器 20 将电子白板上的内容以图片的方式发送给所有客户端，因此，每个客户端都可以看到相同的内容；与会者通过客户端在电子白板上做一些标记：如画线、画圆、输入文字等操作，这些操作都被传到电子白板服务器 20 上；电子白板服务器 20 接收客户端的操作后，更新电子白板的内容，再把更新后的电子白板内容发送给所有客户端，因此实现了所有的参与者共享白板进行讨论的目的。但这种方式在使用范围上受到限制，如用户不能在胶片上进行做标记，即该系统无法实现共享作标记的胶片，另外，该系统需要再建一套电子白板系统，每个会场至少配备一台计算机，增加了系统复杂度和建设成本。

现有技术中，与上述在电子白板上做标记的方式相似的还有一种远程协作的方法，如图 3 所示，该系统中包括一个远程协作服务器 30，每一个视频会场配备一台计算机，如计算机 31，计算机 32，计算机 33，计算机 34 等，这些计算机通过网络与远程协作服务器 30 连接，需要共享自己桌面的会场开启一个远程协作服务，将自己的计算机桌面图像（如 PPT，Word 文档等）共享给所有与会者；其他会场的与会者可通过本地计算机连接到远程协作服务器 30 后，就可看到远程协作服务器 30 共享的计算机桌面，并且通过本地的鼠标、键盘等操作也会传给远程协作服务器 30，因此所有的与会者可以共同操作同一个应用程序，如 PPT、Word 等。但这种系统同样需要再建一套远程协作的系统，每个会场至少配备一台计算机，增加系统的复杂度和成本；更重要的是，需要为每个会场的每台计算机中配置特殊的远程协作参数，且使用者需要操作两套系统，如一个共享的远程系统，一个本地的系统，并且要共享 PPT、Word 等文档需要事先拷贝到会场的计算机中，不能实现笔记本电脑这样的计算机即插即用的特性，操作不方便。

综上，发明人在实现本发明的过程中，发现现有技术至少存在如下问题：

在视频会议系统中，与会者进行数据交互时，现有的视频会议系统为与会者提供的交互数据受到限制，如在电子白板的系统中，为胶片做标记就不能实

现，且电子白板等视频会议系统复杂，成本高。

## 发明内容

本发明要解决的技术问题是提供一种会议终端、会议服务器、会议系统及数据处理方法，在不增加会议系统复杂度的情况下，允许任意会议终端之间进行数据交互，提高会议用户的讨论效率。

为解决上述技术问题，本发明的实施例提供技术方案如下：

一方面，提供一种会议终端，包括：

标记获取模块，用于获取标记数据信号；

图像获取模块，用于获取图像数据信号；

叠加模块，用于将所述图像数据信号和所述标记数据信号进行叠加，生成混合图像数据信号；

输出模块，用于输出所述混合图像数据信号。

另一方面，提供一种会议服务器，包括：

图像数据接收模块，用于接收会议终端发送的图像数据信号；

标记接收模块，用于接收会议终端发送的标记数据信号；

叠加模块，用于对所述图像数据信号和所述标记数据信号进行叠加，生成混合图像数据；

发送模块，用于发送所述混合图像数据或者所述图像数据信号或者所述标记数据信号。

再一方面，提供一种会议系统，包括：第一会议终端，会议服务器和至少一个第二会议终端；其中，

所述第一会议终端包括：

图像获取模块，用于获取所述会议服务器发送图像数据信号；

标记发送模块，用于获取标记数据信号，并向所述会议服务器发送标记数据信号；

所述会议服务器包括：

图像数据接收模块，用于接收所述图像数据信号；

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标记接收模块,用于接收所述标记数据信号;

叠加模块,用于对所述图像数据信号和所述标记数据信号进行叠加,生成混合图像数据;

发送模块,用于向所述第一会议终端和所述至少一个第二会议终端发送所述混合图像数据。

所述至少一个第二会议终端,用于接收并显示所述混合图像数据。

还提供一种会议系统,包括:第一会议终端,会议服务器和至少一个第二会议终端;其中,所述第一会议终端包括:

图像获取模块,用于获取所述会议服务器发送图像数据信号;

标记发送模块,用于获取标记数据信号,并向所述会议服务器发送所述标记数据信号;

所述会议服务器用于接收所述图像数据信号和所述标记数据信号,并转发;

所述至少一个第二会议终端包括:

第一定时器,用于产生第一时间间隔值;

图像获取模块,用于获取所述会议服务器转发的图像数据信号;

第一外部标记获取模块,用于获取所述会议服务器转发的标记数据信号,并按照所述第一时间间隔值输出所述标记数据信号,产生第一标记数据信号;

第一叠加模块,用于将所述图像数据信号和所述第一标记数据信号进行叠加,生成第一混合图像数据信号;

显示模块,用于显示所述第一混合图像数据信号。

还提供一种会议系统,包括:第一会议终端,会议服务器和至少一个第二会议终端;其中,所述第一会议终端包括:

第一定时器,用于产生第一时间间隔值;

第二定时器,用于产生第二时间间隔值;

第一内部标记获取模块,用于获取本地会议终端发送的标记数据信号,并按照所述第一时间间隔值输出所述标记数据信号,产生第一标记数据信号;

第二内部标记获取模块,用于获取本地会议终端发送的标记数据信号,并

按照所述第二时间间隔值输出所述标记数据信号，产生第二标记数据信号；

第二叠加模块，用于将所述图像数据信号和所述第一标记数据信号进行叠加，生成第二混合图像数据；

第二发送模块，用于向所述本地会议终端的显示屏幕上发送所述第一混合图像数据，或者通过辅流通道向所述会议服务器发送所述第二混合图像数据；

所述会议服务器，用于接收所述第二混合图像数据，并转发；

所述第二会议终端，用于接收所述第二混合图像数据并显示。

本发明的实施例还提供一种数据处理方法，包括：

获取图像数据信号；

获取标记数据信号；

将所述图像数据信号和所述标记数据信号进行叠加，生成混合图像数据信号；

输出所述混合图像数据信号。

本发明的实施例还提供一种数据处理方法，包括：

接收会议终端发送的图像数据信号和标记数据信号；

对所述图像数据信号和所述标记数据信号进行叠加，生成混合图像数据；

向会议终端发送所述混合图像数据或者所述图像数据信号或者所述标记数据信号。

本发明的实施例具有以下有益效果：

上述技术方案中，会议终端将其获取的图像数据信号和标记数据信号进行叠加，生成混合图像数据信号，如该混合图像数据信号为添加了标记的胶片，在不增加会议系统复杂度的情况下，该会议终端允许与会者在观看胶片的时候，同时在胶片上画上自己的标记，提高视频会议用户的参与感，提高讨论效率。

## 附图说明

图1为现有技术中会议系统的应用场景结构示意图；

图2为现有技术中会议系统中，利用电子白板进行交互的应用场景结构示

意图;

图 3 为现有技术中的会议系统,利用远程协作服务器进行交互的应用场景结构示意图;

图 4 为本发明的实施例会议终端的整体结构示意图;

图 5 为图 4 所示的会议终端的一具体结构示意图;

图 6 为图 5 所示的会议终端接收本地标记数据信号,并在本地叠加,形成混合图像数据的一具体结构示意图;

图 7 为图 5 所示的会议终端在发送本地的标记数据信号时,第一令牌控制模块从 H.239 的辅流通道中先申请令牌,得到令牌后再开始记录和发送标记数据信号的结构示意图;

图 8 为图 5 所示的会议终端接收外部标记数据信号,并在本地叠加,形成混合图像数据的一具体结构示意图;

图 9 为图 8 中的第一外部标记获取模块的具体结构示意图;

图 10 为图 5 所示的会议终端在进行本地叠加时,第二令牌控制模块从 H.239 的辅流通道中先申请令牌,得到令牌后再进行叠加,形成混合图像数据的结构示意图;

图 11 为图 1 所示会议终端的另一具体结构示意图;

图 12 为会议终端的一具体结构示意图;

图 13 为会议终端的一具体应用场景示意图;

图 14 为会议终端的另一具体应用场景示意图;

图 15 为会议终端的又一具体应用场景示意图;

图 16 为本发明的实施例会议服务器的结构示意图;

图 17 为图 16 所示会议服务器的一具体实施例结构示意图;

图 18 为本发明的实施例的一种会议系统结构示意图;

图 19 为图 18 所示会议系统的多 MCU 级联的应用场景示意图;

图 20 为本发明的实施例的另一种会议系统结构示意图;

图 21 为图 20 所示会议系统的多 MCU 级联的应用场景示意图;

图 22 为本发明的实施例的又一种会议系统结构示意图;

图 23 为图 22 所示会议系统的多 MCU 级联的应用场景示意图;

图 24 为本发明的实施例的数据处理方法的流程示意图；

图 25 为本发明的实施例的另一数据处理方法流程示意图。

### 具体实施方式

为使本发明的实施例要解决的技术问题、技术方案和优点更加清楚，下面将结合附图及具体实施例进行详细描述。

本发明的实施例针对现有技术中不能将 H.239 标准的双流功能和类似电子白板任意添加标记的功能结合起来，使用户的参与感不强的问题，提供一种会议终端，会议服务器，会议系统及会议系统中数据处理的方法。

会议终端的实施例一：

如图 4 所示，为会议终端的实施例结构示意图，本发明的实施例会议终端 40 包括：

标记获取模块 41，用于获取标记数据信号；

图像获取模块 42，用于获取图像数据信号；

叠加模块 43，用于将所述图像数据信号和所述标记数据信号进行叠加，生成混合图像数据信号；

输出模块 44，用于输出所述混合图像数据信号，该混合图像数据信号既可以输出到本地会议终端的显示屏上进行显示，也可以输出到会议服务器，如 MCU，再由 MCU 转发给其他的会议终端。

这里的会议终端 40 可以为视频会议中的某一会场的终端，具体来讲，可以作为一个会议终端服务器，负责对会场中多个输入设备的信号进行管理，该输入设备可以是一个音频输入设备、视频输入设备、电子白板或者书写屏等，当然该会场中，还可以包括：用于视频信号输出的图像显示设备（如普通显示器）、用于音频信号输出的音箱等；图像数据信号可以为胶片或者类似胶片的文件等，标记数据信号为圆圈，批注等，该会议终端 40 将其接收的图像数据信号和标记数据信号进行叠加，生成混合图像数据信号，如该混合图像数据信号为添加了标记的胶片，在不增加会议系统复杂度的情况下，该会议终端允许与会者在观看胶片的时候，同时在胶片上画上自己的标记，提高视频会议用户的参



与感，提高讨论效率。

#### 会议终端实施例二：

如图 5 所示，在会议终端实施例一的基础上，该会议终端 40 还可以包括：第一定时器 45，用于产生第一时间间隔值；第二定时器 46，用于产生第二时间间隔值；这两个定时器在具体实现时，也可以为同一定时器，该定时器可以输出两个时间间隔值；

相应的，上述标记获取模块 41 包括：第一标记获取模块 411，用于接收所述标记数据信号，并按照该第一时间间隔值输出上述标记数据信号，产生第一标记数据信号；该第一时间间隔值是用来控制标记数据信号在本地会议终端的显示屏幕上显示的，保证了本地显示屏的实时显示效果，该第一时间间隔值一般设得比较短，如果该会议终端 40 的显示屏幕为一电视机，则该第一时间间隔值的最佳间隔是与该电视机的帧间隔相同。

第二标记获取模块 412，用于获取上述标记数据信号，并按照该第二时间间隔值输出上述标记数据信号，产生第二标记数据信号；由于该标记数据信号发送到远端的会议终端时，需要在 H.239 辅流通道中进行传输，因此该第二时间间隔值不宜设定的太短，为了降低传输的数据量，可以将该第二时间间隔值设定的大一些，如 1 秒一次。

#### 会议终端实施例三：

如图 6 所示，上述会议终端实施例二中的第一标记接收模块 411 可以具体为：第一内部标记获取模块 4110，用于获取本地会议终端发送的标记数据信号，并按照该第一时间间隔值输出所述标记数据信号，产生第一标记数据信号；如用户通过本地会议终端的触摸屏幕在图像获取模块 42 所接收的图像数据信号（如胶片，该胶片可以是本地的胶片，也可以是接收到远端会议终端发送的胶片）上，添加了圆圈标记，该第一内部标记获取模块 4110 就会按照第一时间间隔值输出该圆圈标记，产生第一标记数据信号。

另外，上述第二标记获取模块 412 也可以具体为：第二内部标记获取模块 4120，用于接收本地会议终端发送的标记数据信号，并按照上述第二时间间隔值输出该标记数据信号，产生第二标记数据信号。

该会议终端还包括一标记编码模块 47 和标记发送模块 48，其中上述第二内部标记获取模块 4110 所产生的第二标记数据信号传输至该标记编码模块 47，该标记编码模块 47 将该第二标记数据信号进行编码，产生第三标记数据信号；该第三标记数据信号传输至该标记发送模块 48，该标记发送模块 48 通过 H.239 协议的辅流通道向会议系统中的会议服务器发送该第三标记数据信号，再由该会议服务器转发给其他的会议终端。

#### 会议终端的实施例四：

如图 7 所示，在上述会议终端的实施例四，会议终端在与会议服务器和其他会议终端进行传输数据的过程中，采用 H.239 协议的辅流通道或者自定义通道进行传输，而 H.239 的主流用于传输活动视频，这样，使静态图像数据的传输和活动视频的传输不冲突。而采用 H.239 的辅流通道进行传输上述本地会议终端产生的标记数据信号或者混合图像数据时，为了保证会议系统中各个会议终端之间的传输不混乱，采用令牌互斥的方式进行，先判断该 H.239 的辅流通道是否支持标记辅流，如果支持，则该会议终端 40 还可包括：

第一令牌控制模块 49，用于在所述 H.239 协议的辅流通道中申请会场令牌，申请成功并得到一会场令牌后，产生第一控制信号；

上述标记发送模块 48 根据该第一控制信号通过 H.239 协议的一个辅流通道向会议服务器发送该第三标记数据信号。

也就是说，当前会议终端 T1 在发送自己的标记数据信号前，先申请一令牌后，自己的标记数据信号才允许在本地显示和发送到远端会议服务器，再由会议服务器转发给其他的会议终端；而系统中的其它会议终端 T2 要想发送自己的标记数据信号，也必须先申请令牌后，才可以发送自己的标记数据信号，当前的令牌拥有者由会议终端 T1 变成了会议终端 T2，这样可以保证多个会议终端发送标记数据信号不被打乱。

#### 会议终端的实施例五：

如图 8 所示，上述所有会议终端的实施例四，该会议终端还应当具有接收功能，具体来讲，上述第一标记获取模块 411 具体为：

第一外部标记获取模块 4111，用于接收会议服务器发送的除本地会议终



端外的至少一个其他会议终端的标记数据信号，并按照上述第一定时器 45 产生的第一时间间隔值输出该标记数据信号，产生第一标记数据信号。

该叠加模块 43 具体为：第一叠加模块 430，用于将所述图像数据信号和所述第一标记数据信号进行叠加，生成第一混合图像数据信号；

上述输出模块 44 具体为：第一发送模块 440，用于向本地会议终端的显示屏幕上发送该第一混合图像数据，并显示。

会议终端实施例六：

如图 9 所示，在一个讨论过程中，可能会有多个会场的会议终端需要同时作标记，为了保证不同会场的标记数据信号的顺序不被打乱，需要进行互斥处理，在上述会议终端实施例五的基础上，当该第一标记获取模块 411 接收到多个会议终端发送的标记数据信号时，该第一外部标记获取模块 4111 包括：

第一外部标记获取子模块 41110，用于接收会议服务器发送的除本地会议终端外的至少一个其他会议终端的标记数据信号；

至少一个解码器，如解码器 1，解码器 2，解码器 3 等，这里的每一个解码器对应一个会场，也就是说，一个会场（即一个其他会议终端）发送来的标记数据信号均进入一个解码器进行解码，各个解码器对接收到的标记数据信号解码后，生成一标记数据信号队列；

标记输出模块 41111，用于按照上述第一时间间隔值和该标记数据信号队列的顺序输出所述标记数据信号，生成至少一个第一标记数据信号。之后再将这些第一标记数据信号顺序送入第一叠加模块 430 中进行叠加，为了保证在叠加时，能够区分出是那个会议终端发送的标记数据信号，每个会议终端在发送自己的标记数据信号时，要包括自己的会议号，终端号和相应的标记数据信号的内容，这些标记数据信号的内容可以用矢量图、二值位图、YUV 或者 RGB 等彩色位图；在使用矢量图或二值位图的时候，可以由会议服务器 MCU 随机给每个会议终端分配一种填充颜色，会议终端的叠加模块在叠加不同会场轨迹的时候使用会议服务器分配的颜色进行填充；在使用 YUV、RGB 等彩色位图表示轨迹的时候，系统中必须统一指定一种透明颜色，以便接收端能正确识别出轨迹的位置与胶片叠加，这样可以保证标记数据信号和图像数据信号叠加

后，每一个会场的混合图像数据的完整性。

在一会议终端接收到其他的会议终端发送的标记数据信号时，同时该会议终端又收到了一个图像数据信号，此时该会议终端就会将其接收到的图像数据信号和标记数据信号进行叠加，形成完整的混合图像数据，这样该会议终端也就知道对方对当前的图像数据作了那些标记。

会议终端的实施例七：

如图 10 所示，当会议系统不支持标记辅流时，此时会议终端只能向其他终端发送混合图像数据，而该混合图像数据是在本地会议终端上叠加生成的，为了保证各个终端发送的混合图像数据的顺序，上述会议终端 40 还可包括：

第二令牌控制模块 50，用于在 H.239 协议的另一个辅流通道中申请会场令牌，申请成功并得到一会场令牌后，产生第二控制信号，叠加模块 43 在得到该第二控制信号时，就可以开始记录标记数据信号和图像数据信号，并对图像数据信号和标记数据信号进行叠加，生成混合图像数据信号。

也就是说，会议终端 T1 在其接收到的胶片上添加标记之前，先申请 H.239 辅流通道控制令牌，在得到令牌后，开始记录用户添加的标记数据信号，并将该标记数据信号叠加到胶片上，形成一混合图像数据，将编码后的混合图像数据通过辅流通道发送给会议服务器，再由会议服务器转发给其他的会议终端。其他会议中的会议终端如果想添加自己的标记数据信号，也进行同样的动作，这样通过不断的切换 H.239 辅流通道发送令牌，各个会场的会议终端都可以将自己的标记添加到该胶片上。

相应的，上述叠加模块 43 具体为：第二叠加模块 431，用于根据上述第二令牌控制模块 50 产生的第二控制信号，将上述图像数据信号和该第一标记数据信号进行叠加，生成第二混合图像数据，如添加了标记的胶片；

上述输出模块 44 具体为：第二发送模块 441，用于向该本地会议终端的显示屏幕上发送该第二混合图像数据，或者通过 H.239 协议的辅流通道向会议服务器发送所述第二混合图像数据。这样，该第二混合图像数据可以在本地会议终端上显示，用户在触摸屏上添加标记之后，就会及时地看到自己绘制的标记轨迹，也同样可以通过 H.239 协议的辅流通道向会议服务器发送该第二混合图

像数据，再由该会议服务器转发给其他的会议终端，这样其他的会议终端就能看到当前该用户添加标记后的胶片了。

会议终端的实施例八：

如图 11 所示，上述各图中所示实施例的会议终端 40 中，还可包括：

图像数据保存模块 51，用于在本地会议终端上保存所述混合图像数据。在会议进行过程中，每一个添加过标记的胶片都可以在本地会议终端上保存，以便记录会议的过程。

标记擦除模块 52，用于将所述混合图像中的标记数据信号进行擦除；用户在添加标记数据信号的过程中，可以将其已经添加的标记数据信号擦除，在令牌控制模式下，令牌所有者可以发一条指令让叠加模块 43 擦除已经添加的标记；

图像发送模块 53，用于将内部图像获取模块 420 所接收的本地会议终端的图像数据信号向会议服务器发送，再由会议服务器转发给其他的会议终端，这样其他的会议终端均可以观看到本地会议终端的图像数据。

另外，上述图像获取模块 42 包括：内部图像获取模块 420，用于获取本地会议终端发送的图像数据信号；外部图像获取模块 421，用于获取会议服务器发送的其他会议终端的图像数据信号；

在上述的所有实施例中，图像获取模块 42 所接收的图像数据信号除了可以为胶片，还可以为一白色背景，该白色背景由会议终端的输入设备产生，如通过触摸屏绘制标记后系统自动生成一白色背景，所有用户标记数据信号都会叠加在该白色背景上，这样用户使用起来更加方便和随意。

会议终端的实施例九：

如图 12 所示，在上述所有实施例中，会议终端 40 所在会场中，可包括多个输入设备，这些输入设备可以为：音频输入设备、视频输入设备、电子白板或者书写屏等，这些输入设备可以直接与该会议终端连接，也可以间接与该会议终端连接：为了使该会议终端 40 所在会场中的多个输入设备之间相互切换，则该会议终端 40 可以通过令牌互斥方式控制该会场中的多个输入设备，因此，该会议终端还可包括：

令牌管理模块 54，用于接收本地会议终端所在会场中的一输入设备的子令牌申请，确认所述子令牌申请成功后，分配一子令牌给所述输入设备；

则上述第一内部标记获取模块 4110，根据所述子令牌，获取所述本地会议终端所在会场中的所述输入设备的标记数据信号，并按照所述第一时间间隔值输出所述标记数据信号，产生第一标记数据信号；

上述第二内部标记获取模块 4112，根据所述子令牌，获取所述本地会议终端所在会场中的所述输入设备的标记数据信号，并按照所述第二时间间隔值输出所述标记数据信号，产生第二标记数据信号。

也就是说，会场中，与该会议终端 40 连接的多个输入设备，谁得到了令牌，该会议终端就接收谁的标记数据信号；当然，对于视/音频信号，该会议终端也可以采用该令牌互斥控制方式进行控制。

另外，该会议终端 40 所在会场中的一个输入设备需要与一目标输入设备进行私密会话时，该会议终端 40 还可包括：

一私密令牌控制模块 55，用于接收本地会议终端所在会场中的一个输入设备发起的与一目标输入设备进行私密会议的私密令牌申请，确认所述私密令牌申请成功后，启用一辅流通道或者自定义通道，分配一私密令牌给该输入设备。这样，该输入设备就可以通过该辅流通道或者自定义通道与目标输入设备进行私密会话。

这里的目标输入设备即可以是除该会议终端 40 所在会场外的其它会场中的一输入设备，也可以是该会议终端 40 所在会场中的一个输入设备。

另外，上述会议终端 40 中的标记获取模块 41 可以具体为一实时标记获取模块，可以实时获取标记数据信号；也可以具体为一手动标记获取模块，可以提供手动接收选项，所述手动接收选项被选择时，获取标记数据信号；

上述会议终端 40 中的图像获取模块 42 可以具体为一实时图像获取模块，可以实时获取图像数据信号；也可以具体为一手动图像获取模块，可以提供手动接收选项，所述手动接收选项被选择时，获取图像数据信号。

会议终端实施例十：

下面结合图 13 说明，该会议终端 40 所在会场的一具体应用场景，如图所

示：会议终端 40 与多点控制单元（MCU）130 连接，该会议终端经网络向多点控制单元 130 传送本会场中的视音频信号和数据信号（包括传统数据信号和互动电子白板产生的互动数据信号）；并接收多点控制单元 130 发送过来的其它会场的视音频信号和数据信号，以传送给本会场输出设备进行显示。

本会场中，还包括：至少一个输入设备，这些输入设备包括：

对于视音频信号：

音频输入设备 131，通常为麦克风，捕捉本会场中的声音信号并传送给会议终端 40；

视频输入设备 132，通常为一个或者多个摄像头，捕捉本会场中的视频信号并传送给会议终端 40；

会议终端 40 将接收到的视音频信号进行编码后通过网络发送给多点控制单元（MCU）130，再由多点控制单元 130 将会场中的编码后信号发送给其它会场进行显示。

对于数据信号：

在会场中布置一数据服务器 135 与会议终端 40 相连；作为发送端，会场中的用户在电子白板 133 和书写屏 134 上的操作数据，如添加标记数据信号等，通过一数据服务器 135，发送到会议终端 40；再由会议终端 40 发送给多点控制单元 130 的同时，并由多点控制单元 130 同时分发给其它会场中的会议终端 40。

作为接收端，会议终端 40 将从多点控制单元（MCU）130 接收到的数据信号传送给会场中的数据服务器 135，数据服务器 135 再把数据信号传递给会场中的电子白板 133 和会场中的一个或者多个书写屏 134；

该会场中，还包括一些信号输出设备，对于视音频信号，作为接收端，其中音频输出设备 136 通常为立体声扬声器，将会议终端设备 40 传送出来的声音信号呈现给会场中的与会者；而视频输出设备（图中未示出），通常为一个或者多个显示屏或投影仪，将会议终端 40 传送过来的视频信号呈现给会场中的与会者。

在需要协作的会议中，需要与会者不断的变化角色，有可能从演讲者转变



为非演讲者,也可能从非演讲者转变为演讲者。考虑现实中的真实的会议场景,演讲人通常是一个人操作完毕后,才能切换为另一个人。因此,作为优选的方案,本发明给出了如何使用控制令牌进行角色切换的操作方法:

a) 整个会议系统设置一个控制总令牌,该会议系统包括至少两个会场,每个会场中设置有会议终端 40,各个会场的会议终端 40 通过 MCU130 连接,并传输信号,该控制总令牌相当于上述会场令牌,一个会场中的演讲者申请得到了该会场令牌,意味着该会场目前是可以发表演讲的会场,如下述应用场景:

当前会场 1 中的第一演讲人已经获得了会场令牌,并在演讲当中;此时会场 2 中的第二演讲人请求获得会场令牌,其获得会场令牌后,第二演讲人切换为主演讲人,其所演讲的内容发送到本会场的其它终端和其它会场中的会议终端。

对应此情况,每一个人机交互设备(电子白板或者书写屏)都可以发出控制令牌申请。除主动申请令牌外,也可主动将控制令牌转移给本会场和其它会场的交互会议终端。

b) 设置分级控制令牌,一个用于会议系统级的总控制令牌(相当于上述的会场令牌),每一个会场内的与会者对应一个子令牌,此方法考虑到存有如下的应用场景:

首先在本地会场产生一个方案,获得会场内一致同意后,再将最终形成的方案分发给其它会场,此时分两种情况:

第一种情况,第一演讲人和第二演讲人在同一个会场中,第一演讲人正在演讲,在此情况下,第二演讲人申请到本会场的子令牌后,即可切换为主演讲人;第一演讲人也可主动将子令牌转交给本地会场中的第二演讲人。

第二种情况,第一演讲人和第二演讲人不在同一个会场当中,第一演讲人正在演讲,在此情况下,第二演讲人发出令牌申请后,先申请该第二演讲人所在会场的会场令牌,申请成功后;再申请会场内的子令牌,获得子令牌后,开始切换为主演讲人;第一演讲人也可主动将会场令牌转给第二演讲人所在的会场,第二演讲人所在的会场再把本地子令牌分发给第二演讲者。

特殊的,对于如下的应用场景:首先在本地会场产生一个方案,获得会场

内一致同意后,再将最终形成的方案分发给其它会场,在没有在本会场取得一致意见,并启动传送功能以前,本会场中的数据服务器 135 并不把未完成的标记信息发送给会议终端 40,而是仅仅发送给本会场中的其它与会者。在启动传送功能后,会议终端 40 就将获得的标记信号传递给多点控制单元 130,再由多点控制单元 130 传递给其它会场。

该实施例中,会议终端 40 与多点控制单元 130 之间传输数据时,需要采用 H.239 协议,H.239 协议给出了控制信道、主流通道和辅流通道,其中,主流通道用来传送会场之间的视频信号,而辅流通道则可以用于传送 PPT、Word 或者标记等数据信号,在传送这些数据信号时,其传输方法如上述会议终端 40 的实施例一至十中所述的方法,在此不再赘述,如:

a)将 PPT 和标注信息叠加后一起编码,在同一个信道中进行传送。

b)将 PPT 数据和标注信息分别编码,并在不同的信道中传送。但也可以给编码后的 PPT 数据和标注信息加上不同的标志,在同一个信道中进行传送。

c)演讲者为了更准确的描述展示思想,往往需要多种工具,例如不同的颜色,不同的在电子白板上的操作会实时的反映到其它会场中的显示设备上。

每一个会场中的会议终端 40,接收 MCU130 传送来的视音频信号或者数据信号时,实时或者手动接收的应用场景如下:

1)作为发送端的会场,对应书写屏 134,实时或者手动操作传送批注等数据信号:使用书写屏 134 的人作为演讲人,讲解 PPT 的同时,并在上面进行标记,例如画了一条直线,每隔固定间隔的时间就将该演讲人动作所产生的图像发送给数据服务器 135 或者由演讲人手动启动传输功能,数据服务器 135 再将此图像发送给本地会场中的电子白板 133 和它的书写屏,以及会议终端 40,会议终端 40 再发送给多点控制单元 130,再由多点控制单元 130 转发给其它会场中的会议终端 40;

作为接收端的会场,该其它会场的该会议终端 40 可以实时或者手动接收该多点控制单元 130 转发来的数据信号。

2)对应使用电子白板,并实时或者手动传送批注:使用电子白板 133 的人作为演讲人,讲解 PPT 的同时,并在上面进行标记,例如画了一条直线,

每隔固定间隔的时间就将该演讲人动作所产生的图像发送给数据服务器 135 或者由演讲人手动启动传输功能,数据服务器 135 再将此图像发送给本地会场中的书写屏 134,以及会议终端 40,会议终端 40 再发送给多点控制单元 130,再由多点控制单元 130 转发给其它会场中的会议终端 40;

作为接收端的会场,该其它会场的该会议终端 40 可以实时或者手动接收该多点控制单元 130 转发来的数据信号。

3) 在上述场景中,非演讲人所使用的电子白板、书写屏所对应的其它与会者可能需要对讲演做批注,其它与会者在接收到的屏幕上进行自己的批注。

考虑演讲人演讲和本会场和其它与会者进行批注的速度不可能时刻保持一致,此时有可能发生如下两种情况:

其它与会者在批注的第一页面和演讲者正在讲演的第二页面是同一页面。

其它与会者在批注的第一页面和演讲者正在讲演的第二页面不是同一页面。

作为一解决方案,此时需要给其它与会者的接收终端提供模式切换开关,如果仅是希望被动的接受,则可以将运行模式切换到即时更新模式,在即时更新模式下,接收终端所显示的内容随演讲者的变化而变化,此时其它与会者不能进行批注操作;如果希望进行批注,则将模式切换到批注保持模式,此时该终端的内容不随演讲者的内容进行更新,其它与会者可以进行批注。待批注完成后,将状态切换到更新模式即可。

4) 在场景 1~2 中,批注者可能希望随时将自己的批注或者传送过来的页面进行保存,以备会议后进行总结或者回顾。简单的方法,批注者所操作的电子白板或者书写屏在启用保存功能后,将当前的批注保存到本地会场中的数据服务器 135 中。

5) 考虑到出于保密或私下交谈的需要,可能会议当中的某两个与会者需要进行私密的交流,在此应用场景下,需要给需要进行私密交流的与会者之间启动一路辅流,在该辅流中建立一个私密令牌,两个私密交流者获得该私密令牌后,首先私密交流者 1 发送批注给私密交流者 2;私密交流者 2 收到私密交流者 1 发送过来的批注后,再发送自己的批注信息给私密交流者 1,以进行私



密的交流。

如图 14, 作为对图 13 的一种变形, 电子白板 133 和书写屏 134 直接和会场中的会议终端 40 相连, 数据服务器 135 仅用来存储要演讲的 PPT 等传统数据或者批注信息。

如图 15, 作为对图 13 的另一种变形, 以会议终端 40 为中心, 电子白板 133 和书写屏 134 仅和会场中的会议终端 40 相连, 数据服务器 135 和会议终端 40 相连, 数据服务器 135 仅作为电子白板 133 中演示的数据或者演讲的 PPT 等传统数据或者批注信息等的存储设备。

当然该会议终端 40 也可以具有一存储模块, 代替该数据服务器 135, 对数据信号进行保存; 特别的, 电子白板 133 这样的输入设备也可以具有存储功能, 存储自己产生的数据信号或者其接收的会议终端转发来的其它与会者的数据信号。

上述的各个会议终端的实施例, 无需增加其他的设备, 在现有的 H.239 双流的基础上实现与会者之间的数据协作, 实现会场中多个输入源, 如电子白板、书写屏, 与其它会场中的输入源之间的动态交互, 提高用户的参与感, 提高讨论效率。

会议服务器的实施例一:

如图 16 所示, 本发明的实施例还提供一种会议服务器 60, 该会议服务器通常为一 MCU (多点控制单元), 用在视频会议中, 为视频会议中的各个会议终端提供数据的转发和服务。该会议服务器 60 包括:

图像数据接收模块 61, 用于接收会议终端发送的图像数据信号;

标记接收模块 62, 用于接收会议终端发送的标记数据信号;

叠加模块 63, 用于对所述图像数据信号和所述标记数据信号进行叠加, 生成混合图像数据;

发送模块 64, 用于向会议终端发送所述混合图像数据或者所述图像数据信号或者所述标记数据信号。

会议服务器的实施例二:

如图 17 所示, 上述叠加模块 63 在对图像数据信号和标记数据信号进行叠

加时，可能会收到多个会议终端发送的标记数据信号，该叠加模块 63 需要对每个会议终端发送的标记数据信号进行区分，该叠加模块 63 具体包括：

填充模块 631，用于为所述标记数据信号分配填充颜色或者透明颜色，并利用所述填充颜色或者透明颜色对所述标记数据信号进行处理，产生颜色标记数据信号；标记数据信号的内容可以用矢量图、二值位图、YUV 或者 RGB 等彩色位图表示；在使用矢量图或二值位图的时候，可以随机给每个会议终端的标记数据信号分配一种填充颜色，叠加模块 63 在叠加不同会场轨迹的时候使用上述填充颜色进行填充；在使用 YUV、RGB 等彩色位图表示标记数据信号的时候，MCU 须指定一种透明颜色，以便接收会议终端能正确识别出轨迹的位置，这样可以保证标记数据信号和图像数据信号叠加后，每一个会场的混合图像数据的完整性。

处理模块 632，用于将所述图像数据信号和所述颜色标记数据信号进行叠加，生成混合图像数据。

该会议服务器 60 在向会议终端发送混合图像数据或者标记数据信号时，还可包括：发送控制模块 65，用于选择 H.239 协议的一辅流通道，控制所述发送模块 64 通过所述辅流通道向会议终端发送所述混合图像数据或者所述标记数据信号；

具体实现时，该会议服务器 60 还可包括：令牌管理模块 66，用于接收会议终端发送的会场令牌申请，确认所述会场令牌申请成功后，向该会议终端返回一会场令牌；该发送控制模块 65 根据该会场令牌，选择 H.239 协议的一辅流通道，控制所述发送模块 64 通过所述辅流通道向会议终端发送所述混合图像数据或者所述标记数据信号；

当系统中存在多个会议服务器的情况下，该会议服务器还可将其叠加的混合图像数据或者会议终端发送过来的标记数据信号或者会议终端发送过来的图像数据信号转发给其他的会议服务器，再由其他的会议服务器发送给与该其他的会议服务器连接的会议终端。

该会议服务器 60 在会议终端不具有叠加功能时，将各个会议终端发送的图像数据信号（如胶片）和标记数据信号进行叠加，然后再转发给其他的会议

终端,使会议系统中的各个会议终端都能够看到其他会议终端添加的标记,实现与会者之间的协作,提高用户的参与感,提高用户的讨论效率。

会议系统的实施例:

下面将上述的会议终端和会议服务器组成的会议系统进行介绍:

上述的会议终端和会议服务器主要可以组成以下三种应用场景:

一,会议终端 1 将共享的图像数据信号发送给会议服务器,会议终端 2 将本地的标记数据信号也发送给会议服务器,由会议服务器对图像数据信号和标记数据信号叠加后,形成一混合图像数据,再发送给所有的会议终端,会议终端接收到会议服务器发送的混合图像数据时,对该混合图像数据进行解码并显示;

二,会议终端 1 将共享的图像数据信号发送给会议服务器,会议终端 2 将本地的标记数据信号发送给会议服务器,再由会议服务器转发给所有的会议终端,会议终端在接收到图像数据信号和标记数据信号时,对图像数据信号和标记数据信号进行叠加,并显示;

三,会议终端 1 将共享的图像数据信号(该图像数据信号可为本地的图像数据,也可为接收到的远端的图像数据)和本地的标记数据信号在本地叠加后,生成一混合图像数据,再将混合图像数据通过 H.239 辅流通道发送给会议服务器,再由会议服务器转发给其他的会议终端 2,其他的会议终端 2 接收到混合图像数据时,对该混合图像数据进行解码并显示。

上述各种应用场景中,各会议终端都是对等的,会议终端 1 具有在本地叠加的能力,会议终端 2 也具有在本地叠加的能力,会议终端 1 具有发送本地图像数据和标记数据信号的能力,会议终端 2 也具有发送本地图像数据和标记数据信号的能力。

会议系统的实施例一:

如图 18 所示,为上述第一种应用场景的会议系统结构示意图,该会议系统包括:会议终端 71,与该会议终端 71 连接的一笔记本电脑 72;会议服务器 73;会议终端 74,与会议终端 74 连接的带触摸屏的显示器 75;会议终端 76,与会议终端 76 连接的普通显示器 77,该会议终端的个数不作限制,这里的每

一个会议终端都代表一个会场；其中，上述会议终端 71 包括：

图像发送模块 53，用于向会议服务器 73 发送图像数据信号；

上述会议终端 74 包括：

标记发送模块 48，用于向会议服务器 73 发送标记数据信号；

会议服务器 73 如上述会议服务器 60，包括：

图像数据接收模块 61，用于接收图像发送模块 53 发送的图像数据信号；

标记接收模块 62，用于接收所述标记发送模块 48 发送的标记数据信号；

叠加模块 63，用于对所述图像数据信号和所述标记数据信号进行叠加，生成混合图像数据；

发送模块 64，用于向会议终端 71，会议终端 74，会议终端 76 发送所述混合图像数据。

会议终端 71 和会议终端 76，用于接收并显示所述混合图像数据。

具体来讲，该应用场景主要包括以下流程：

1) 会议终端 71 是需要和其他与会者共享胶片的会场，使用者只需要将笔记本电脑通过普通的 VGA 电缆连接到会议终端 71，再通过 H.239 辅流通道将自己的胶片发送给会议服务器 73，再由会议服务器 73 将该胶片发送给会议终端 74 和会议终端 76；

2) 会议终端 74 是一个接有带触摸屏显示器 75 的会场，该会场用户在观看胶片的过程中发现有一个地方有疑问需要与其他人讨论，因此，他在显示器 75 上需要讨论的地方画了一个圆圈，该圆圈被显示器上的触摸屏记录下来，并且通过会议终端 74 传递给会议服务器 73；当然，在会议服务器 73 没有该会议终端 74 的用户所观看的胶片时，该会议终端 74 还需要将该胶片也发送给会议服务器 73。

3) 会议服务器 73 接收到会议终端 74 发送过来的圆圈标记后，先将胶片视频流进行解码，得到胶片图像；再将会议终端 72 发送的圆形标记叠加到胶片图像上；将叠加圆形标记的混合图像进行编码；把编码后的混合图像码流通过 H.239 辅流通道发送给所有会场；

4) 会议终端 76 是一个普通会场，该会议终端 76 连接一普通的显示器 77，

该会场通过 H.239 辅流通道接收到会议服务器 73 发送的混合图像视频码流，进行解码后即可看到叠加了会议终端 74 会场发送的圆形标记的胶片图像。

同样，会议终端 71 和其他所有会场也会接收到和会议终端 76 一样的胶片图像。如果有其他会场具备会议终端 74 一样的标记输入设备，其他会场也可以发送自己的标记并且被所有的会场看到。

#### 会议系统的实施例二：

如图 19 所示，在上述会议系统的实施例一的基础上，描述会议系统中多会议服务器级联的应用场景，该图中的双箭头表示混合图像数据流的传输：

当系统中的会议服务器为多个时，这多个会议服务器之间采用级联的方式连接，每一个会议服务器下都可连接一个或者多个会议终端，其中一个会议服务器为主会议服务器，而其他的会议服务器为从会议服务器，会议终端发送的共享图像数据信号和添加的标记数据信号的叠加由主会议服务器进行；

该实施例中，以两个 MCU（会议服务器）级联的实例进行说明，其中包括：MCU1，MCU2，会议终端 T1，会议终端 T2，会议终端 T3；MCU1 为主 MCU，MCU2 为从 MCU，多于 2 个 MCU 级联的情况，也是如此，其中一个 MCU 为主 MCU，其他 MCU 为从 MCU；

会议中，会议终端 T1 将共享图像数据信号发送给与其相连的 MCU2，会议终端 T2 也将它的标记数据信号发送给与其相连的 MCU2 上，从 MCU2 将 T1 的共享图像数据信号和 T2 的标记数据信号，转发给会议系统中的主 MCU，即 MCU1，由会议系统中主 MCU（MCU1）完成对图像数据信号和标记数据信号的叠加，压缩形成混合图像数据，然后再转发给会议系统中的各个会议终端，对于连接在从 MCU（MCU2）上的会议终端，混合图像数据由主 MCU 先发送给会议中的各个从 MCU，然后由从 MCU 进行转发。会议系统中的各个终端收到混合图像数据时，对其进行解码并显示。

对于更多级的 MCU 级联，与上面类似，会议中图像数据信号和标记数据信号的叠加工作，是由级联会议系统中的主 MCU 完成。

上述描述的是系统中多 MCU 级联时一个可以为主 MCU，其他的均为从 MCU 的情况，当然，系统中的多个 MCU 也可均为主 MCU。即每个 MCU 均



可以进行叠加和转发的工作，为了使多个 MCU 能够协调的工作，系统中还可以包括：控制单元，用于获取所述标记数据信号的发送时间，按照所述标记数据信号的发送时间的先后顺序，产生一控制信号；

所述至少两个主会议服务器中的所述叠加模块，根据所述控制信号对所述图像数据信号和所述标记数据信号进行叠加，生成所述混合图像数据，并将混合图像数据信号发送给系统中的各会议终端。上述的控制单元可以通过系统中的 GATEKEEPER（网守，是一种采用软交换方式的交换服务器，负责 VoIP 网路上的讯号交换及控制功能）来实现，当然采用其他类似功能的控制模块也可以实现。

当然，除了上述 GATEKEEPER 来控制各个会议服务器之间进行协调工作外，还可以采用令牌控制的方式，系统中，将各个会议终端发送标记数据信号的时间通知各个主会议服务器，主会议服务器根据该标记信号的发送时间主动获取一控制令牌，当该主会议服务器完成叠加工作之后，按照各个会议终端发送的标记数据信号的时间先后顺序，下一个主会议服务器获取该控制令牌，继续进行叠加工作，直到最后一个主会议服务器完成叠加，将最终的混合图像数据信号发送给系统中的各个会议终端；上述控制令牌是各个主会议服务器主动获取的，当然也可以由 GATEKEEPER 主动将控制令牌分配给各个主会议服务器使用。

会议系统的实施例三：

如图 20 所示，为上述第二种应用场景的会议系统结构示意图，该会议系统包括：会议终端 81，与该会议终端 81 连接的一笔记本电脑 82 和一普通显示器 83；会议服务器 84；会议终端 85，与会议终端 85 连接的带触摸屏的显示器 86；会议终端 87，与会议终端 87 连接的普通显示器 88；这里的每一个会议终端都代表一个会场；该会议终端的个数不作限制，其中，上述会议终端 81 包括：

图像发送模块 53，用于向会议服务器 83 发送图像数据信号；

会议终端 85 包括：

标记发送模块 48，用于向会议服务器 83 发送标记数据信号；

会议服务器 83 将接收图像数据信号和标记数据信号转发会议终端 87 和会议终端 81;

会议终端 87 和会议终端 81 均包括:

第一定时器 45, 用于产生第一时间间隔值;

图像获取模块 42, 用于接收所述会议服务器转发的图像数据信号;

第一外部标记获取模块 4111, 用于接收所述会议服务器 83 转发的标记数据信号, 并按照所述第一时间间隔值输出所述标记数据信号, 产生第一标记数据信号;

第二叠加模块 431, 用于将所述图像数据信号和所述第一标记数据信号进行叠加, 生成第二混合图像数据信号;

显示模块, 如显示器 88, 用于显示所述第二混合图像数据信号。

会议终端 87 在接收到多个会议终端的标记数据信号时, 为了保证接收方在叠加时, 能够区分出是哪个会议终端发送的标记数据信号, 每个会议终端在发送自己的标记数据信号时, 要包括自己的会议号, 终端号和相应的标记数据信号的内容。这些标记数据信号的内容可以用矢量图、二值位图、YUV 或者 RGB 等彩色位图; 在使用矢量图或二值位图的时候, 可以由会议服务器随机给每个会议终端分配一种颜色, 会议终端的叠加模块在叠加不同会场轨迹的时候使用会议服务器分配的颜色进行填充; 在使用 YUV、RGB 等彩色位图表示轨迹的时候, 系统中必须统一指定一种透明颜色, 以便接收端能正确识别出标记轨迹的位置与胶片叠加。具体讲上述第一外部标记获取模块 4111 包括:

第一外部标记获取子模块 41110, 用于接收所述会议服务器发送的除本地会议终端外的至少一个其他会议终端的标记数据信号, 根据上述标记数据信号中会议号, 终端号等信息找到相应的解码器, 并发送属于该解码器的标记数据信号;

至少一个解码器, 用于对所述至少一个其他会议终端的标记数据信号分别进行解码, 生成一标记数据信号队列;

标记输出模块 41111, 用于按照所述第一时间间隔值和所述标记数据信号队列的顺序输出所述标记数据信号, 生成至少一个第一标记数据信号。

该应用场景主要包括以下流程:

1) 会议终端 81 是需要跟其他与会者共享胶片的会场, 使用者只需将笔记本电脑 (目前一般是通过 VGA 线缆) 连接到第一会议终端 81, 再通过 H.239 辅流通道将自己的胶片发送给所有与会者;

2) 会议终端 85 是一个接有带触摸屏显示器 86 的会场, 该会场的用户在观看胶片的过程中发现有一个地方有疑问需要与其他人讨论, 因此他在显示器上需要讨论的地方画了一个圆圈, 该圆圈被显示器上的触摸屏记录下来, 并且通过会议终端 85 传递给会议服务器 84;

3) 会议服务器 84 将会议终端 85 发送的圆形标记发送给会议终端 87 和会议终端 81。

4) 会议终端 87 是一个普通会场, 该会场同时收到会议终端 81 发送的胶片码流和会议终端 85 发送的圆形标记, 会议终端 87 对胶片码流进行解码后得到胶片图像, 再将圆形标记叠加到该胶片图像上即可看到叠加了圆形标记的胶片图像。

如果有其他会场具备会议终端 85 一样的标记输入设备, 其他会场也可以发送自己的标记并且被所有的会场看到。

会议系统实施例四:

如图 21 所示, 在上述会议系统的实施例三的基础上, 描述会议系统中多会议服务器级联的应用场景, 该图中的双箭头表示混合图像数据流的传输:

假设, 系统中有两个 MCU 进行级联, 其中 MCU1 为主 MCU, MCU2 为从 MCU, 多于 2 个 MCU 级联的情况, 与此类似, 其中一个 MCU 为主 MCU, 其他 MCU 为从 MCU;

会议系统中, 会议终端 T1 将共享的图像数据信号发送给会议系统中与其相连的 MCU2, 会议终端 T2 将本地的标记数据信号发送给与其相连的 MCU2, 从 MCU2 将 T1 的共享图像数据信号和 T2 的标记数据信号, 转发给会议系统中的主 MCU, 即 MCU1, 由会议系统中主 MCU 直接将接收到的共享图像数据信号和标记数据信号转发给会议系统中的各个会议终端, 对于连接在从 MCU 上的会议终端, 共享图像数据信号和标记数据信号由主 MCU 先发送给



会议系统中的各个从 MCU，然后由从 MCU 进行转发。会议系统中的各个会议终端收到共享图像数据信号和标记数据信号后，对其进行叠加，然后显示。

对于更多级的 MCU 级联，操作与上面类似，发送给会议系统中各个会议终端的共享图像数据信号和标记数据信号，是由级联会议中的主 MCU 来统一收集、转发来完成的。

该实施例中，若多个 MCU 均为主 MCU 时，同样 MCU 会按照标记数据信号的添加时间先后顺序，产生一控制信号，各主 MCU 根据该控制信号将其接收到的标记数据信号顺序转发给接收端的会议终端，由接收端的会议终端进行叠加，并显示。当然也可以按照各标记数据信号的添加时间先后顺序获取一控制令牌，该控制令牌即可以是主 MCU 主动获取，也可以是系统的中的控制单元进行下发，各主 MCU 根据该控制令牌对其接收到的标记数据信号进行转发，由各个接收端会议终端接收并进行叠加。

会议系统的实施例五：

如图 22 所示，为上述第三种应用场景的会议系统结构示意图，该会议系统包括：会议终端 91，与该会议终端 91 连接的一笔记本电脑 92；会议服务器 93；会议终端 94，与会议终端 94 连接的带触摸屏的显示器 95；会议终端 96，与会议终端 96 连接的普通显示器 97；这里的每一个会议终端都代表一个会场，该会议终端的个数不作限制，其中，上述会议终端 91 包括：

第二定时器 46，用于产生第二时间间隔值；

第一内部标记接收模块 4110，用于接收本地会议终端发送的标记数据信号，并按照所述第一时间间隔值输出所述标记数据信号，产生第一标记数据信号；

第二内部标记接收模块 4120，用于接收本地会议终端发送的标记数据信号，并按照所述第二时间间隔值输出所述标记数据信号，产生第二标记数据信号。

第一叠加模块 430，用于将所述图像数据信号和所述第一标记数据信号进行叠加，生成第一混合图像数据；

第一发送模块 440，用于向所述本地会议终端的显示屏幕上发送所述第一

混合图像数据,或者通过 H.239 协议的辅流通道向所述会议服务器发送所述第一混合图像数据;

所述会议服务器 93,用于接收所述至少一个会议终端 94 发送的所述第一混合图像数据,并转发;

所述会议终端 96 和会议终端 91,用于接收所述第一混合图像数据,对所述第一混合图像数据进行解码,并显示。

具体来讲,该应用场景主要包括以下流程:

1) 在初始状态下,会议终端 91 连接笔记本电脑,并且申请到 H.239 辅流令牌,通过辅流通道向其他会场共享胶片(相当于把共享胶片通过辅流通道发送其他终端),因此会议终端 94 和会议终端 96 都看到会议终端 91 的胶片。

2) 当观看到某个胶片时,会议终端 94 的用户想在胶片上做一个标记,为了能将自己的标记传给其他人,会议终端 94 的操作过程如下

2.1) 申请 H.239 辅流通道控制令牌;

2.2) 判断会议控制者(当前令牌拥有者)是否同意申请,若是,得到令牌,开始记录会议终端 94 的触摸屏 95 的标记数据信号,并将该标记数据信号叠加到该会议终端 94 所观看的胶片图像上;

2.3) 将叠加标记数据信号后的胶片进行编码;

2.4) 将编码后的胶片码流通过 H.239 辅流通道发送会议服务器 93。

此时会议终端 94 为 H.239 辅流的发送者,其他会场如果想添加自己的标记,也做同样操作,这样通过不断切换 H.239 辅流发送令牌,各个会场都可以将自己的标记添加到该胶片上。

当然,在该种系统中,会议终端 94 也可以采用令牌控制的方式单独发送通过触摸屏 95 所添加的标记,将标记作为 H.239 的第二路辅流(胶片传输为第一路辅流),在会议召开时能力交换需要增加两个参数: 1.是否支持第二路辅流; 2.第二路辅流是否是标记信息;

如果第二路辅流是标记信息,则默认使用令牌的方式进行控制。也就是说,发送标记时,也采用申请令牌的方式进行,本方案中所说“第二路”仅表明一个序号,区别胶片辅流,实际上可以是任意一个辅流。

采用令牌控制方式发送标记的流程如下:

3.1) 申请标记辅流控制令牌;

3.2) 申请成功, 则得到一令牌, 开始记录通过触摸屏 95 所添加的标记数据信号;

3.3) 将用户的标记数据信号(标记轨迹)作为单独辅流发送给会议服务器 93, 再由会议服务器 93 转发给其他的会议终端。

当然在实际的使用过程中, 可以将上述令牌控制标记数据信号发送的方式和令牌控制混合胶片的方式结合起来。

会议系统的实施例六:

如图 23 所示, 在上述会议系统的实施例五的基础上, 描述会议系统中多会议服务器级联的应用场景, 该图中的双箭头表示混合图像数据流的传输:

假设, 系统有两个 MCU 进行级联, 其中 MCU1 为主 MCU, MCU2 为从 MCU, 多于 2 个 MCU 级联的情况, 与此类似, 其中一个 MCU 必定为主 MCU, 其他 MCU 为从 MCU;

会议终端 T1 将共享的图像数据信号和本地的标记数据信号在本地叠加之后生成一混合图像数据, 在将混合图像数据通过 H.239 辅流通道发送给 MCU2, MCU2 将其转发给会议中的主 MCU(MCU1), 会议中主 MCU(MCU1) 将收到的混合图像数据发送给会议系统中的各个从 MCU, 连接在会议系统中从 MCU 上的会议终端, 通过从 MCU 接收该从 MCU 转发的混合图像数据。

对于更多的 MCU 级联, 操作与上面类似, 发送给会议系统中各个会议终端的混合图像数据, 是由级联会议中的主 MCU 来统一转发来完成的, 当然系统中的各个 MCU 也都可以为主 MCU, 为了保证系统中网络不被拥塞, 各个 MCU 之间需要以一定的顺序进行转发, 并选择其中一个 MCU 将混合图像数据进行最后的转发。

在上述会议系统的所有实施例中, 会议终端与会议服务器之间进行数据传输时, 当网络出现拥塞或者是丢包的时候, 可以采用如下方法解决网络拥塞或者丢包的问题, 使会议系统中的用户有更好的参与体验:

1) 采用可靠的传输, 如: 图像数据信号、混合图像数据信号等数据量较

大的数据采用 UDP 协议进行传输，不致出现网络的拥塞；

2) 采用抗丢包技术，使用一些丢包恢复技术，进行冗余数据传输，当出现小丢包时，如标记数据信号，因为其数据量较小，接收端通过冗余数据及收到的数据一同恢复出被丢失的数据，可以使用可靠的传输协议 TCP 协议来进行传输，以确保标记数据信号能够安全地在各个设备间传输；当然，标记数据信号，也可以使用可靠的传输，如使用 UDP 协议进行传输。

所有的现有系统上的抗丢包技术，都可以应用到本交互应用上来，以改善丢包或是网络拥塞情况下的应用体验。

在标记数据信号由会议终端发送给会议服务器，再由会议服务器转发给其他的会议终端时，可以通过如上述 IP 网的 TCP 协议、UDP 协议，当然也可以采用如 H.320 系统的 HMLP 协议进行传输，为了保证实时性，在 IP 网络中通常使用 UDP 协议进行传输。

当然，在 MCU 侧或者接收侧的会议终端侧，也可以通过记录接收到数据的时间，并按照接收时间的先后顺序对接收到的图像数据信号和标记数据信号进行叠加，以保证各个会议终端添加的标记数据信号能够被正确的叠加，提高用户的体验；或者会议终端在发送图像数据信号、标记数据信号时，添加一时间戳，记录发送的时间，MCU 接收到该图像数据信号或者标记数据信号时，可以获取该时间戳，尤其是对于标记数据信号，按照标记数据信号的发送时间对图像数据进行叠加，使各个会议终端的标记数据信号与图像数据信号能够被正确的叠加，提高用户的体验和参与感。

在上述的几种会议系统，在实现用户相互协作交互的过程中，无需另外构造数据会议系统和设备，在现有的 H.239 双流的基础上实现与会者之间的数据协作，提高用户的参与感和讨论效率。

方法的实施例：

如图 24，本发明的实施例还提供一种数据处理方法，包括：

步骤 S160，获取图像数据信号；

步骤 S161，获取标记数据信号；

步骤 S162，将所述图像数据信号和所述标记数据信号进行叠加，生成混

合图像数据信号;

步骤 S163, 输出所述混合图像数据信号, 该混合图像数据即可以输出到本地会议终端上进行显示, 也可以输出到会议服务器, 再由会议服务器转发给其他的会议终端。

该方法通过将获取的图像数据信号和标记数据信号进行叠加, 生成混合图像数据信号, 如该混合图像数据信号为添加了标记的胶片, 该允许与会者在观看胶片的时候, 同时在胶片上画上自己的标记, 提高视频会议用户的参与感, 提高讨论效率。

下面为上述图 24 所示的方法的一具体实现过程:

步骤 S170, 获取图像数据信号;

步骤 S171, 获取本地会议终端输入的标记数据信号;

步骤 S172, 产生第一时间间隔值;

步骤 S173, 产生第二时间间隔值;

步骤 S174, 按照所述第一时间间隔值输出所述标记数据信号, 产生第一标记数据信号;

步骤 S175, 按照所述第二时间间隔值输出所述标记数据信号, 产生第二标记数据信号, 并对该第二标记数据信号进行编码, 生成第三标记数据信号;

步骤 S176, 判断是否支持标记辅流, 若支持, 执行步骤 S177, 若不支持执行步骤 S178 或者通过自定义通道发送所述第三标记数据信号;

步骤 S177, 在 H.239 协议的辅流通道中申请会场令牌, 申请成功并得到一会场令牌后, 产生第一控制信号, 根据所述第一控制信号通过 H.239 协议的一个辅流通道向会议服务器发送所述第三标记数据信号;

步骤 S178, 在 H.239 协议的另一个辅流通道中申请会场令牌, 申请成功并得到一会场令牌后, 产生第二控制信号, 根据所述第二控制信号将所述图像数据信号和所述第一标记数据信号进行叠加, 生成第一混合图像数据;

步骤 S179, 向所述本地会议终端的显示屏幕上发送所述第一混合图像数据, 或者通过 H.239 协议的辅流通道向会议服务器发送所述第一混合图像数据, 再由会议服务器转发给其他的会议终端。



该实现过程中，步骤 S171 之前还可包括：接收本地会议终端所在会场中的一输入设备的子令牌申请，确认所述子令牌申请成功后，分配一子令牌给该输入设备；则步骤 S171 可具体为：根据该子令牌，获取本地会议终端所在会场中的所述输入设备的标记数据信号。

另外，若接收的标记数据信号为其他终端发送的标记数据信号时，上述图 24 所示的方法的另一具体实现过程：

步骤 S180，获取图像数据信号；

步骤 S181，获取会议服务器发送的除本地会议终端外的至少一个其他会议终端的标记数据信号；具体来讲，可以实时或者手动接收，会议服务器发送的除本地会议终端外的至少一个其他会议终端的标记数据信号；

步骤 S182，产生第一时间间隔值；

步骤 S183，对所述至少一个其他会议终端的标记数据信号分别进行解码，生成一标记数据信号队列；

步骤 S184，按照所述第一时间间隔值，根据所述标记数据信号队列的顺序输出所述标记数据信号，生成至少一个第一标记数据信号；

步骤 S185，将所述图像数据信号和所述第一标记数据信号进行叠加，生成第二混合图像数据信号；

步骤 S186，向本地会议终端的显示屏幕上发送所述第二混合图像数据。

其中上述标记数据信号包括：会议标号，会议终端标号和标记数据信号内容；其中，会议标号，会议终端标号主要为了保证接收方在叠加时，能够区分出是那个会议终端发送的标记数据信号；而标记数据信号内容用矢量图、二值位图、YUV 色彩位图或者 RGB 色彩位图来表示，在使用矢量图或二值位图的时候，可以由会议服务器随机给每个会议终端分配一种颜色，会议终端的叠加模块在叠加不同会场轨迹的时候使用会议服务器分配的颜色进行填充；在使用 YUV、RGB 等彩色位图表示轨迹的时候，系统中必须统一指定一种透明颜色，以便接收端能正确识别出标记数据信号的位置与胶片叠加。

另一方法的实施例：

如图 25 所示，本发明的实施例还提供一种数据处理方法，包括：

步骤 S190, 接收会议终端发送的图像数据信号和标记数据信号;

步骤 S191, 对所述图像数据信号和所述标记数据信号进行叠加, 生成混合图像数据;

步骤 S192, 向会议终端发送所述混合图像数据或者所述图像数据信号或者所述标记数据信号。

步骤 S191 包括: 为所述标记数据信号分配填充颜色或者透明颜色, 并利用所述填充颜色或者透明颜色对所述标记数据信号进行处理, 产生颜色标记数据信号; 标记数据信号的内容可以用矢量图、二值位图、YUV 或者 RGB 等彩色位图表示;

将所述图像数据信号和所述颜色标记数据信号进行叠加, 生成混合图像数据。在使用矢量图或二值位图的时候, 可以随机给每个会议终端的标记数据信号分配一种填充颜色, 在叠加不同会场轨迹的时候使用上述填充颜色进行填充; 在使用 YUV、RGB 等彩色位图表示标记数据信号的时候, MCU 须指定一种透明颜色, 以便接收会议终端能正确识别出轨迹的位置, 这样可以保证标记数据信号和图像数据信号叠加后, 每一个会场的混合图像数据的完整性。

步骤 S192 之前还可包括: 接收会议终端发起的会场令牌申请, 确认所述会场令牌申请成功后, 向该会议终端返回一会场令牌; 则步骤 S192 中, 根据该会场令牌, 向会议终端发送所述混合图像数据或者所述标记数据信号时, 该会议服务器可选择 H.239 协议的一辅流通道, 通过所述辅流通道向会议终端发送所述混合图像数据或者所述标记数据信号。支持 H.239 协议, 系统结构简单, 且使会议系统中的各个会议终端都能够看到其他会议终端添加的标记, 实现与会者之间的协作, 提高用户的参与感, 提高用户的讨论效率。

本领域普通技术人员可以理解实现上述实施例方法中的全部或部分步骤是可以通程序来指令相关的硬件来完成, 所述的程序可以存储于一可读取存储介质中, 该程序在执行时, 包括如上述方法实施例的步骤。

以上所述是本发明的优选实施方式, 应当指出, 对于本技术领域的普通技术人员来说, 在不脱离本发明所述原理的前提下, 还可以作出若干改进和润饰, 这些改进和润饰也应视为本发明的保护范围。

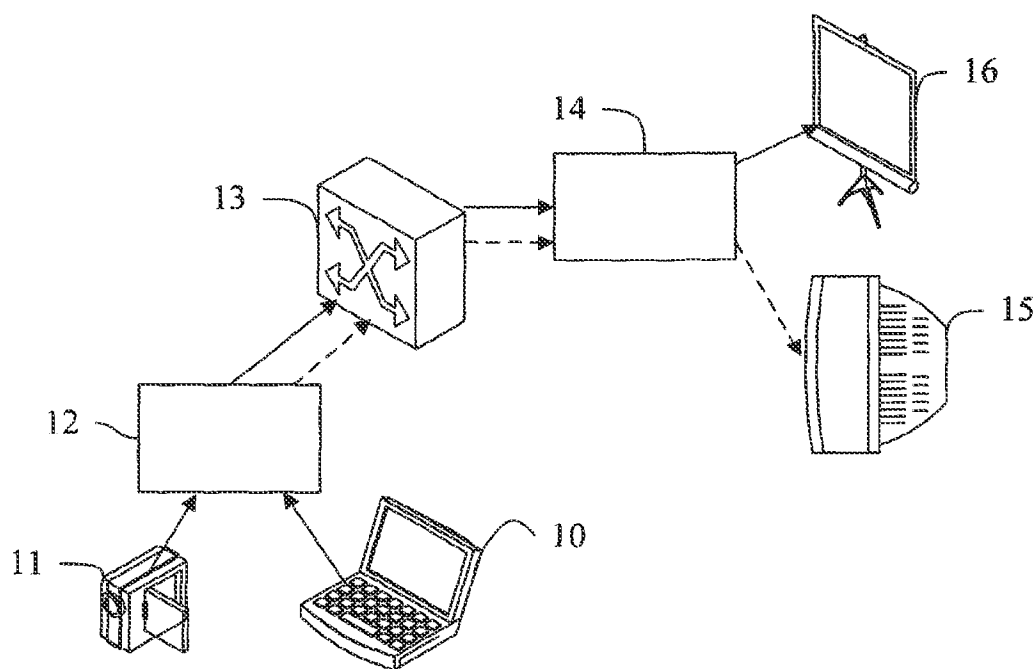


图 1

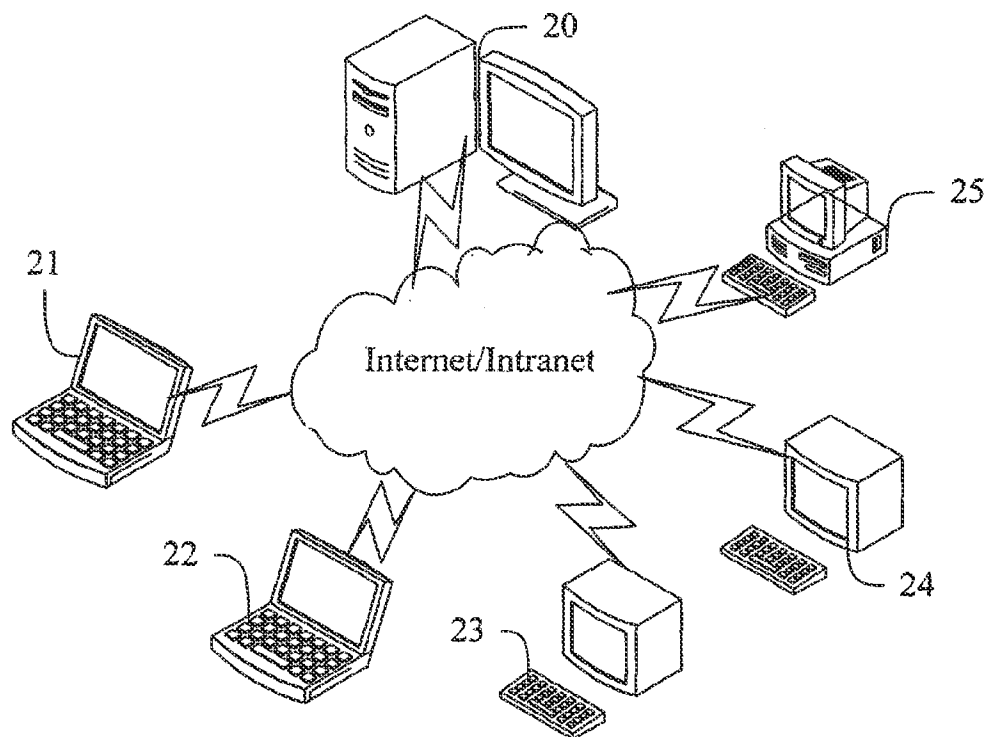


图 2



200910202849.6

说明书附图 第2/13页

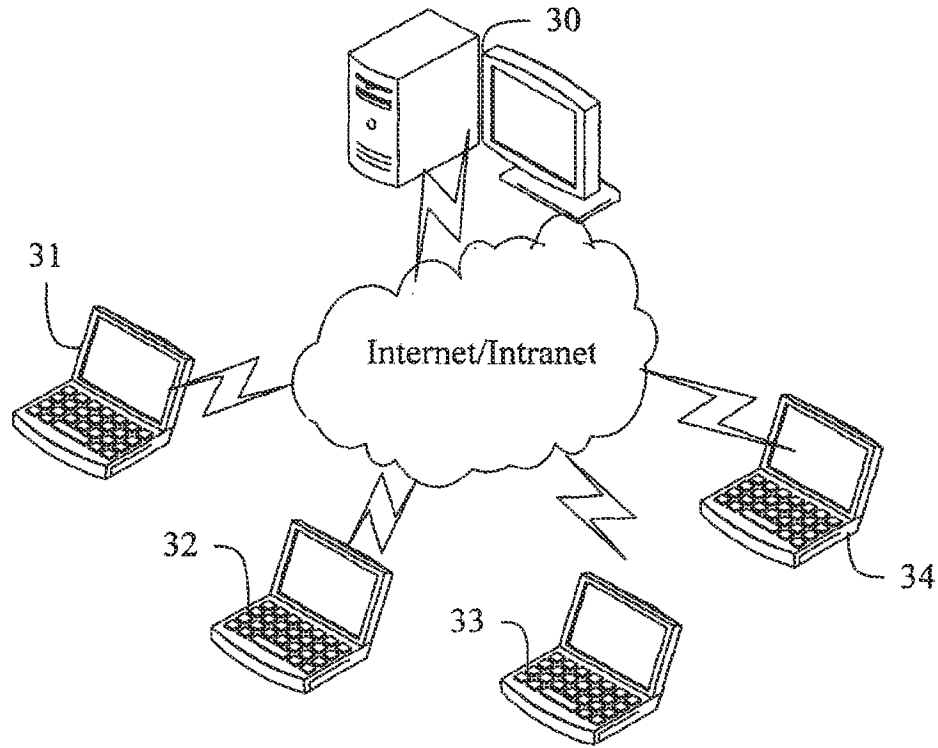


图 3

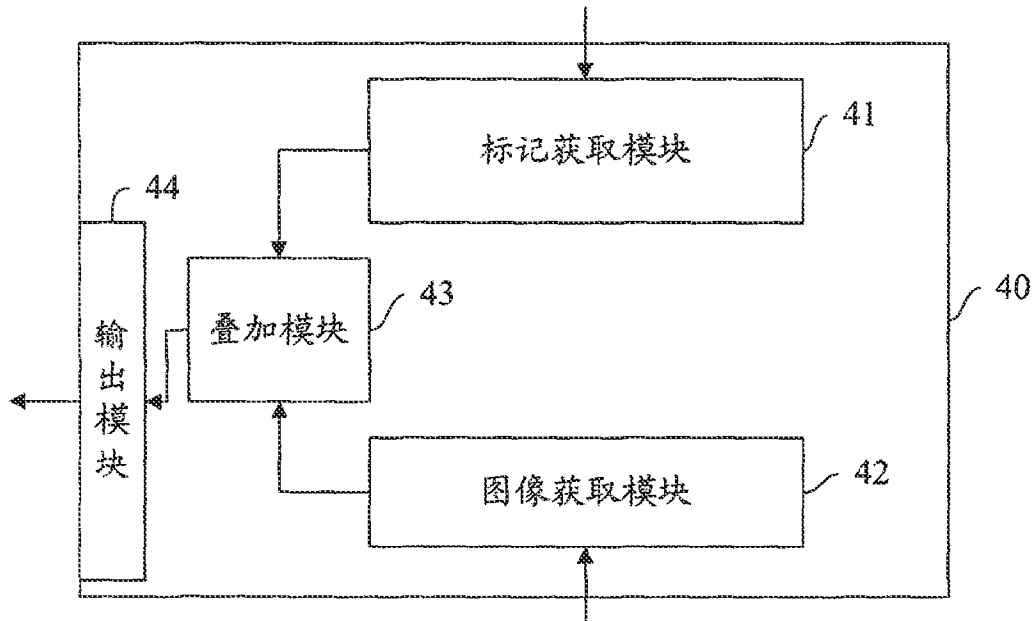


图 4

200910202849.6

说明书附图 第3/13页

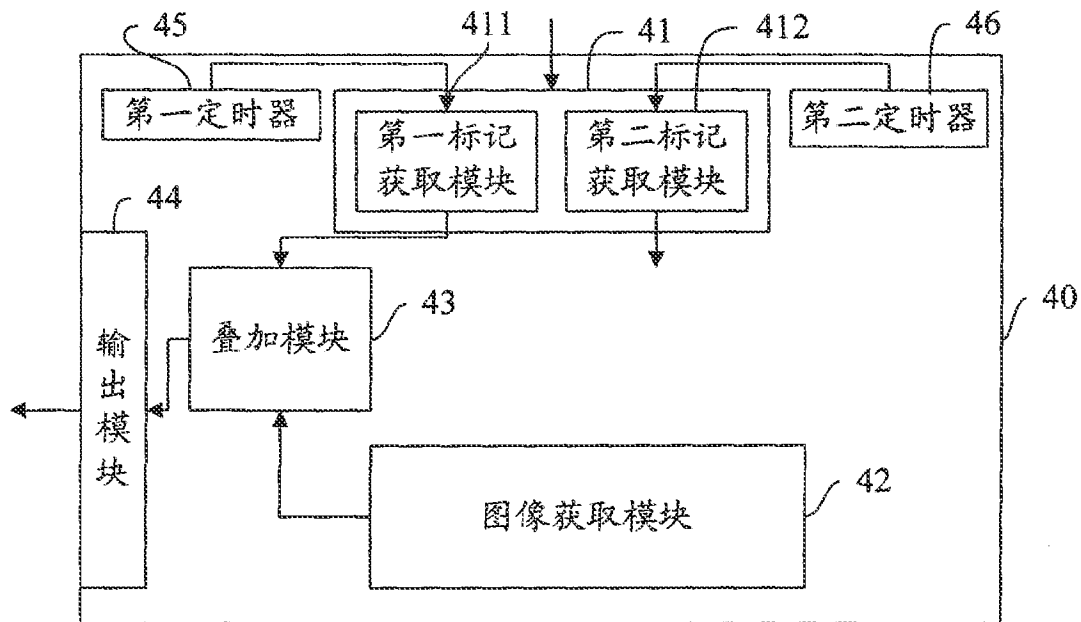


图 5

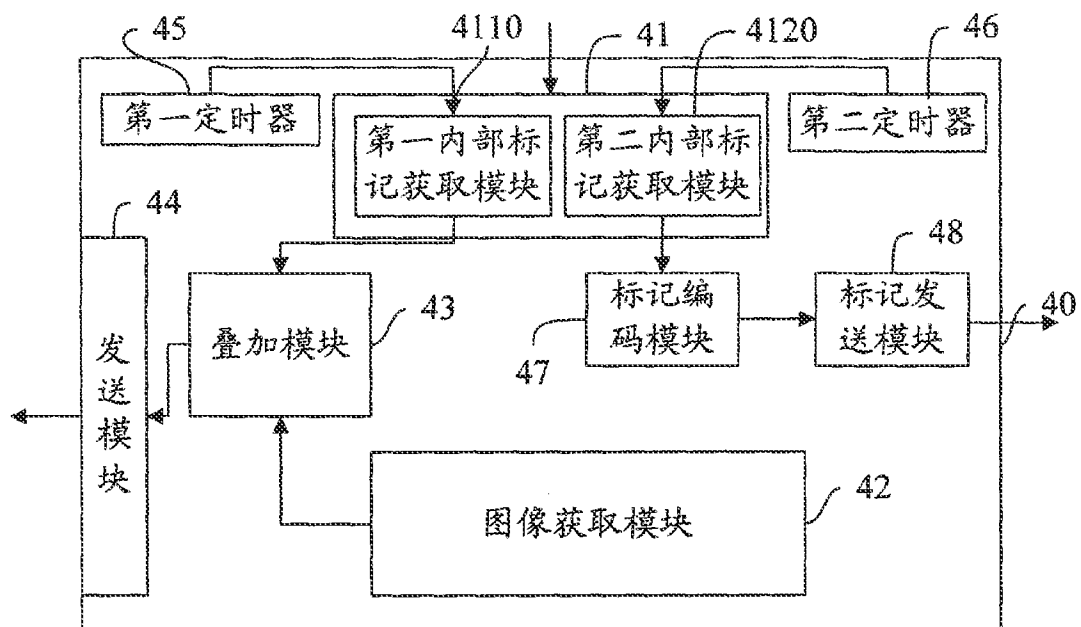


图 6

200910202849.6

说明书附图 第4/13页

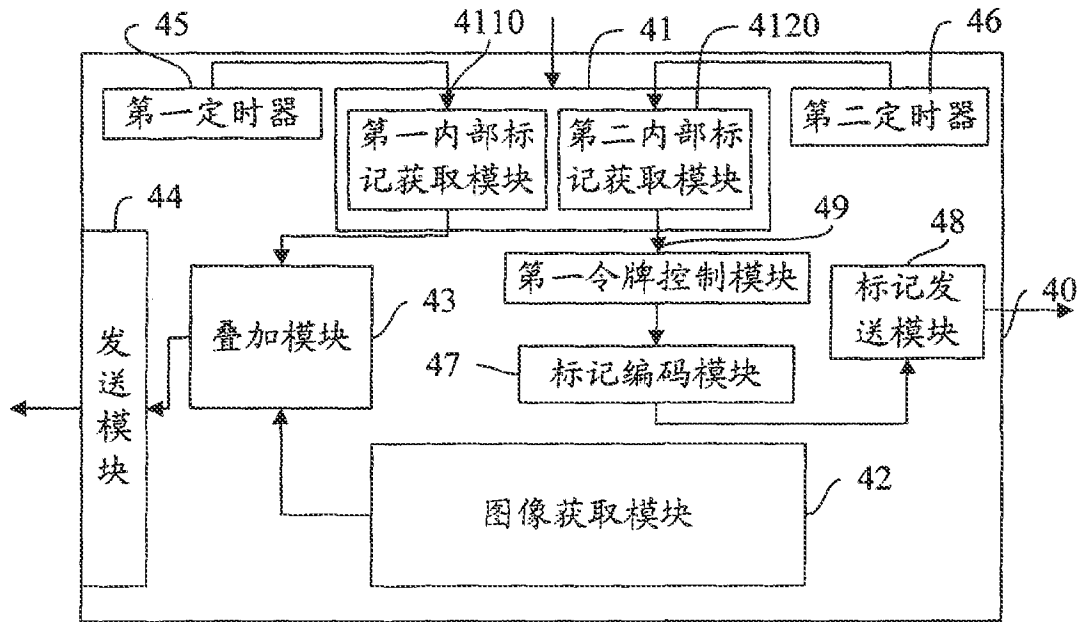


图 7

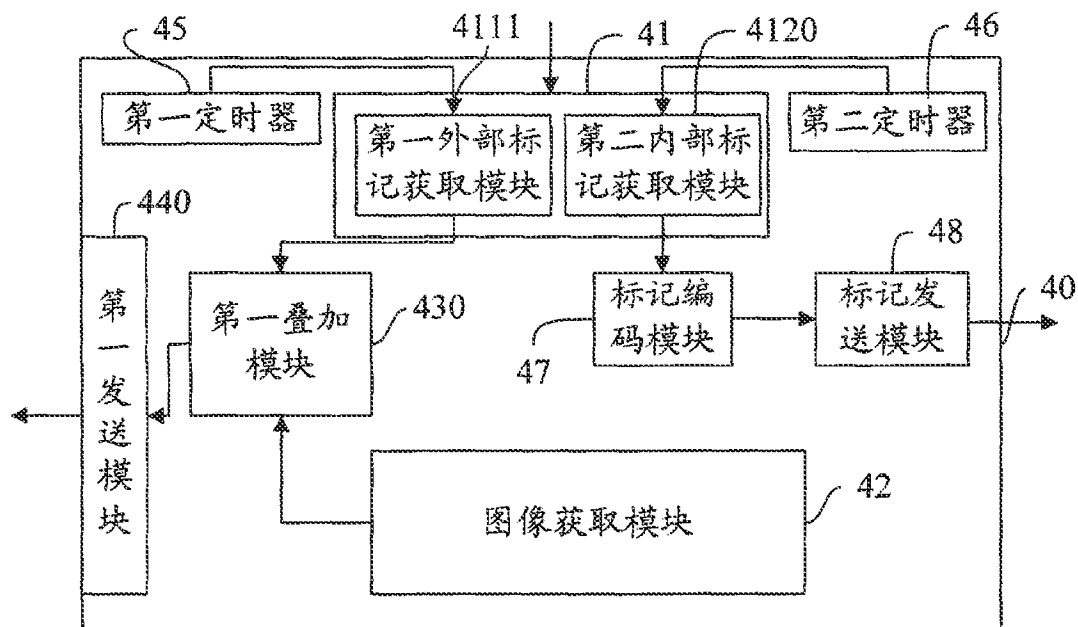


图 8

200910202849.6

说明书附图 第5/13页

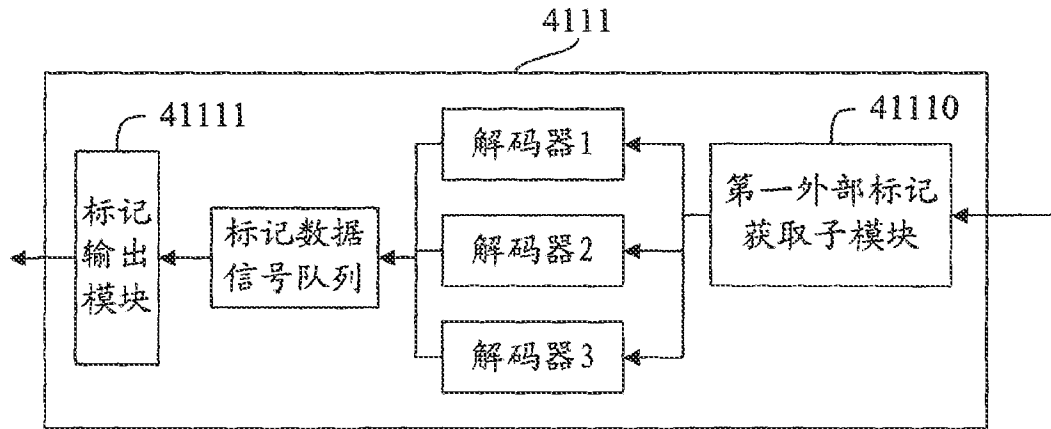


图 9

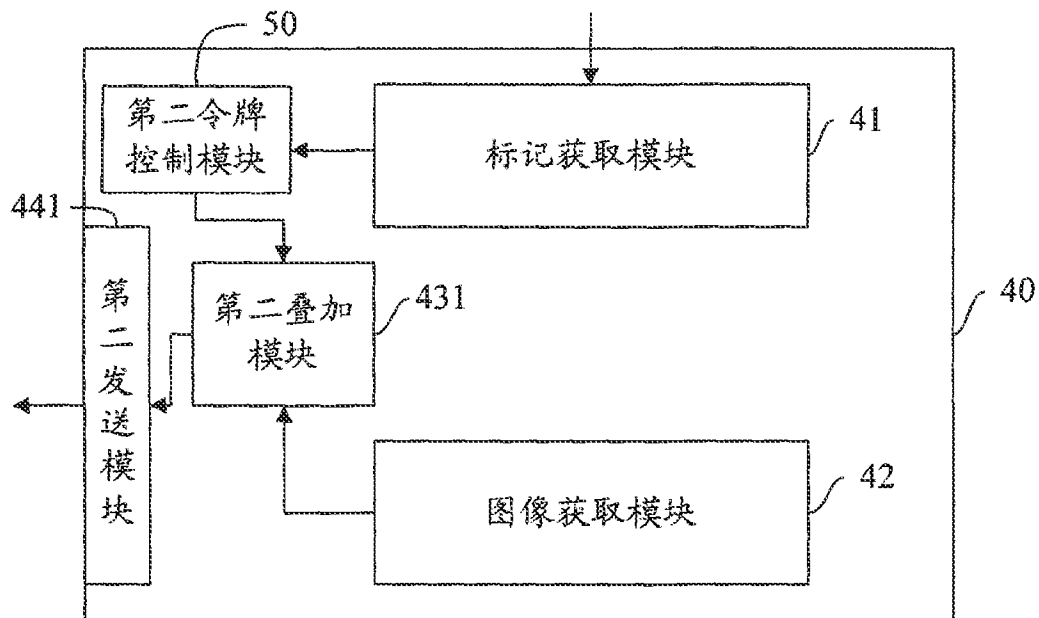


图 10

200910202849.6

说明书附图 第6/13页

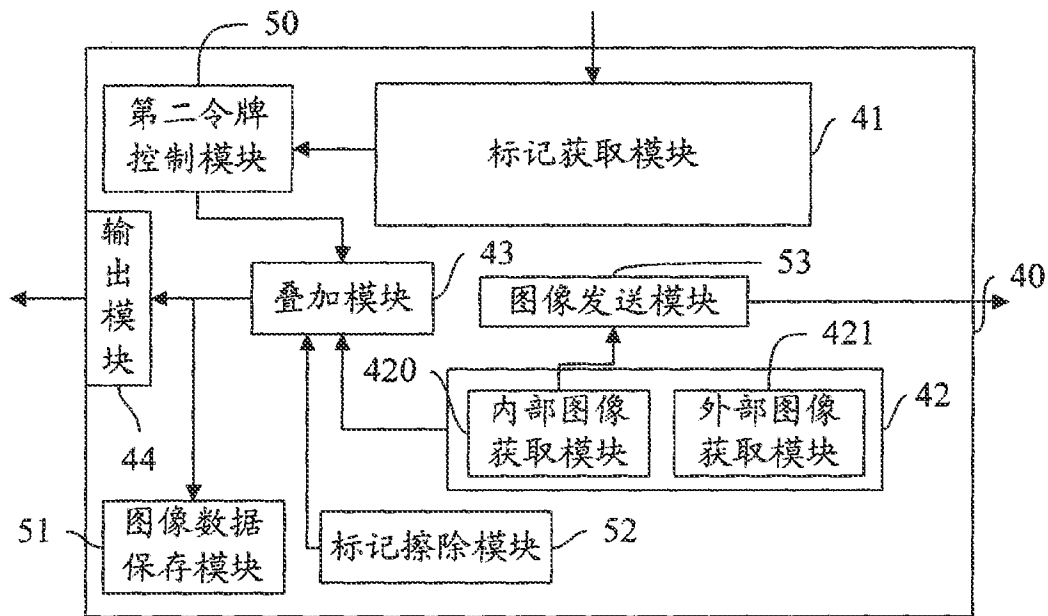


图 11

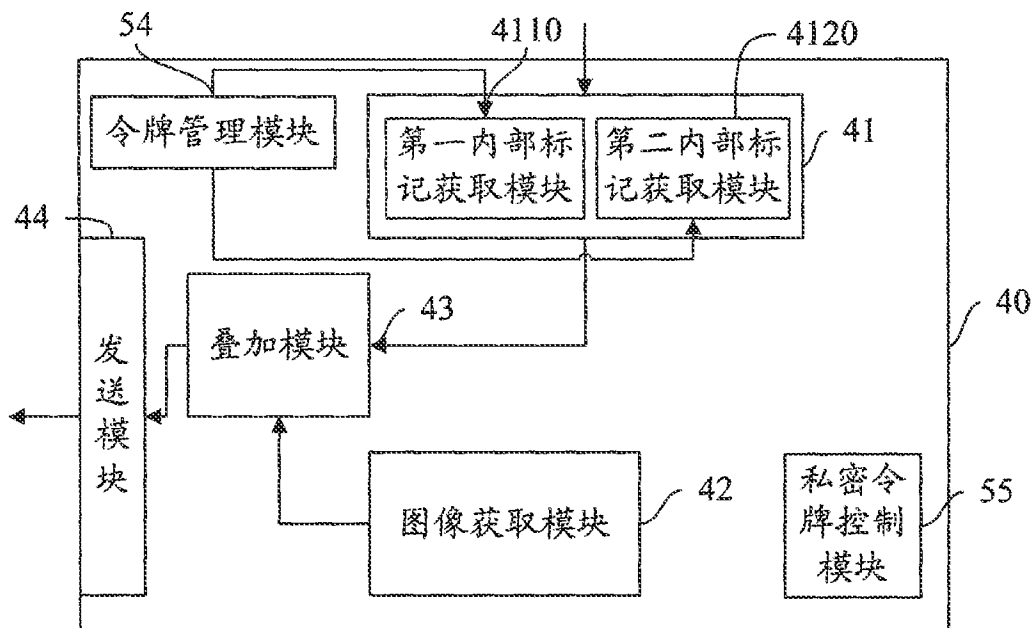


图 12

200910202849.6

说明书附图 第7/13页

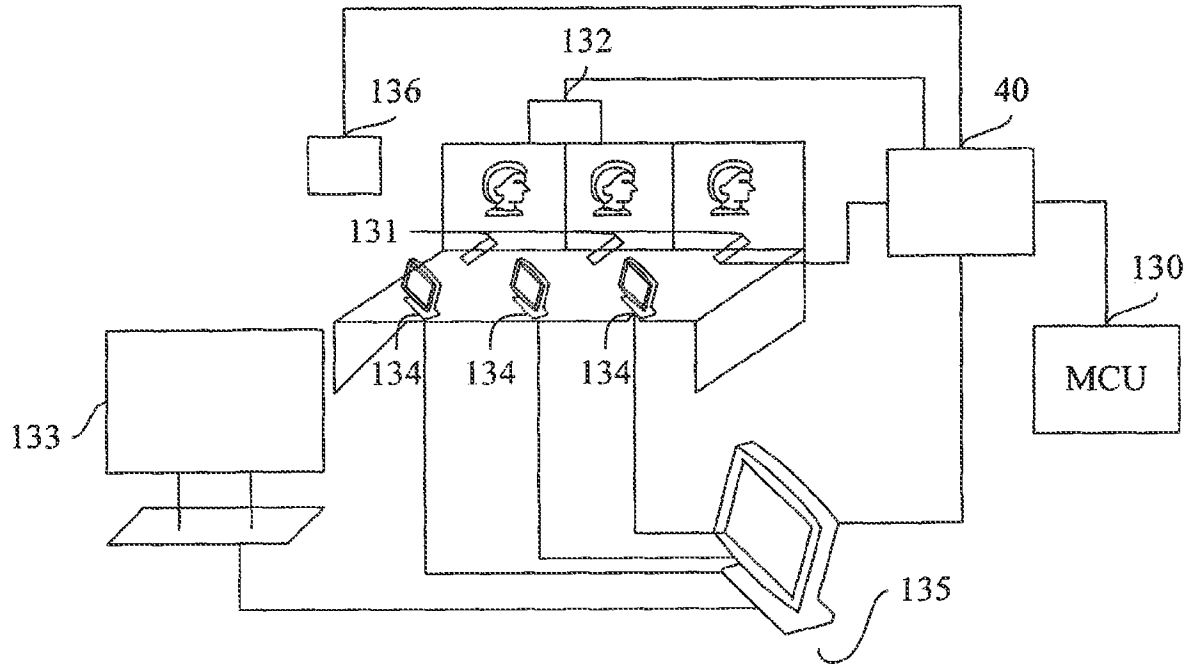


图 13

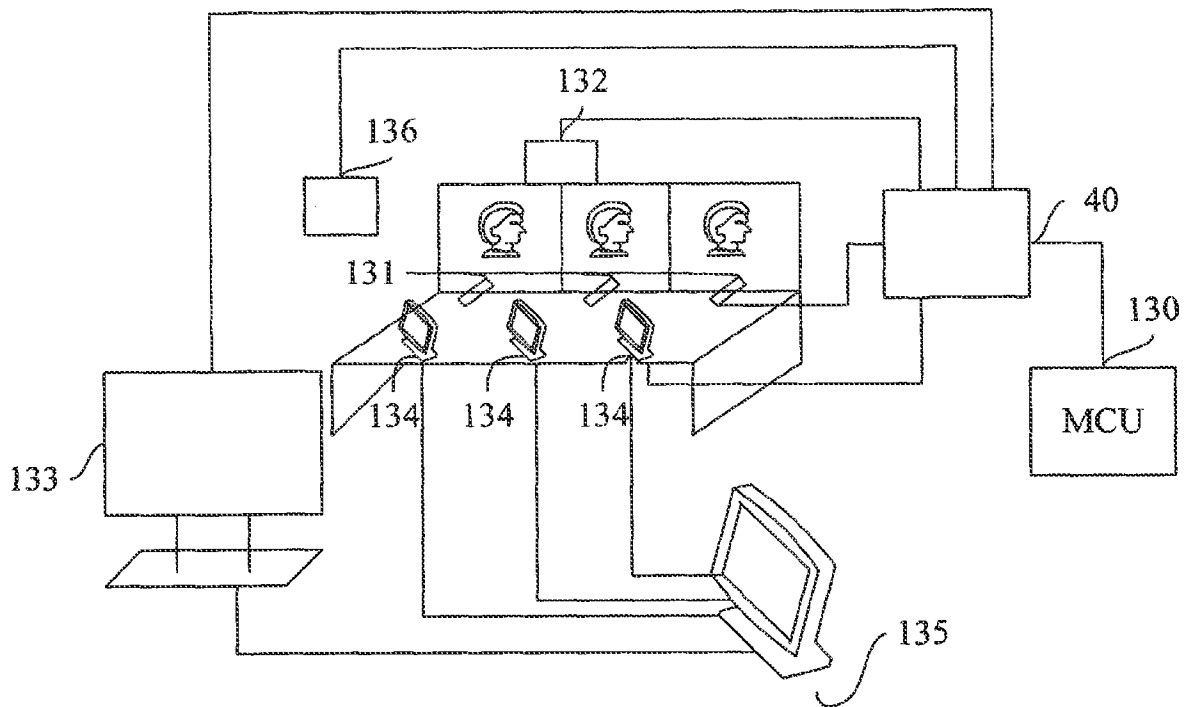


图 14

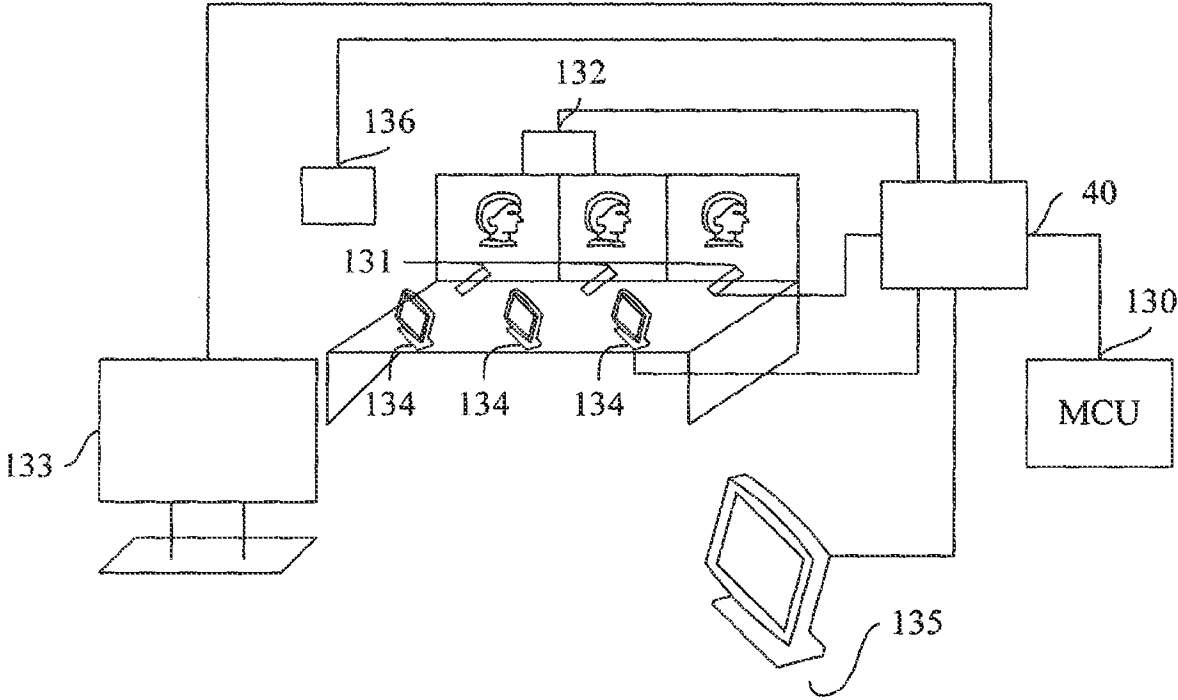


图 15

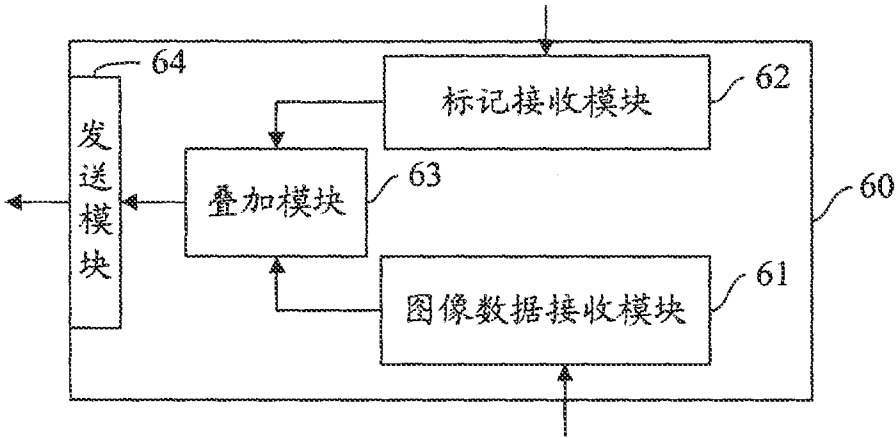


图 16

200910202849.6

说明书附图 第9/13页

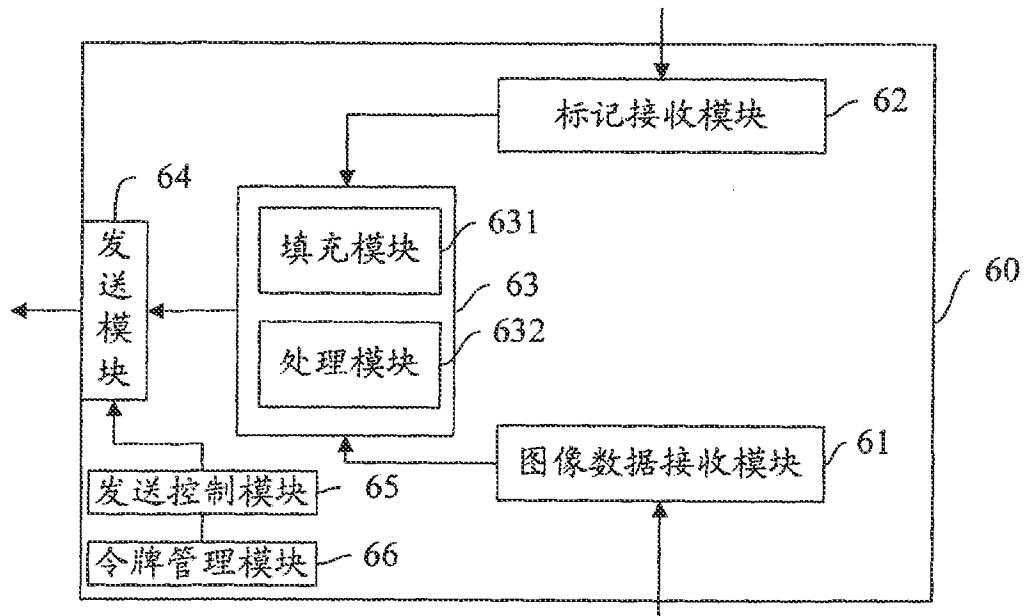


图 17

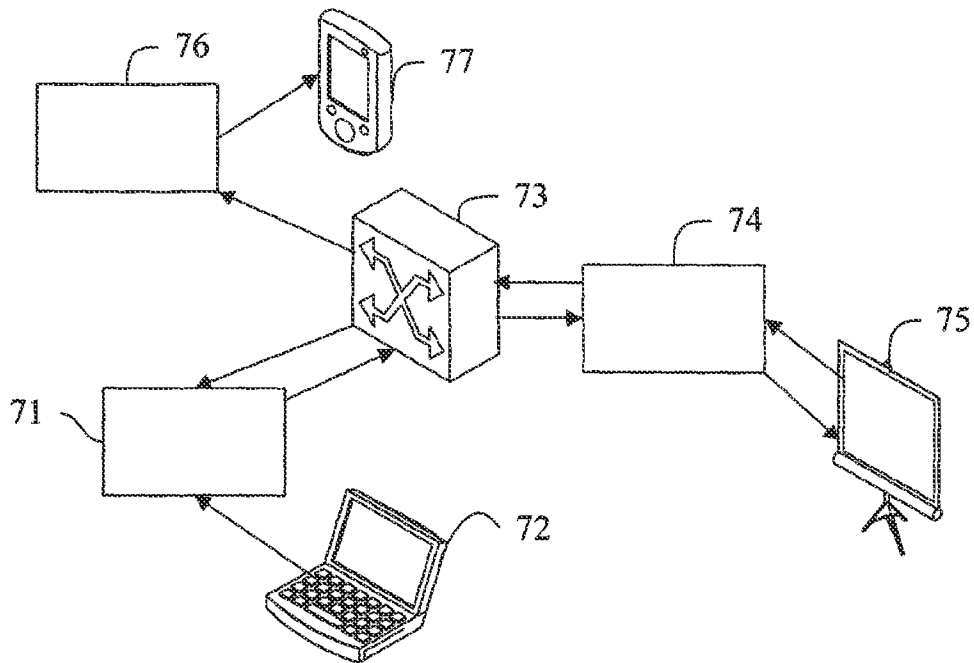


图 18



200910202849.6

说明书附图 第10/13页

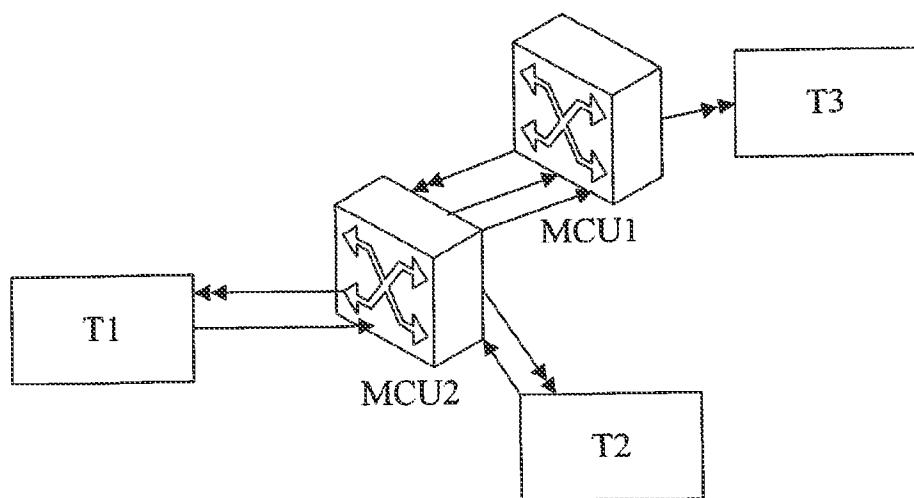


图 19

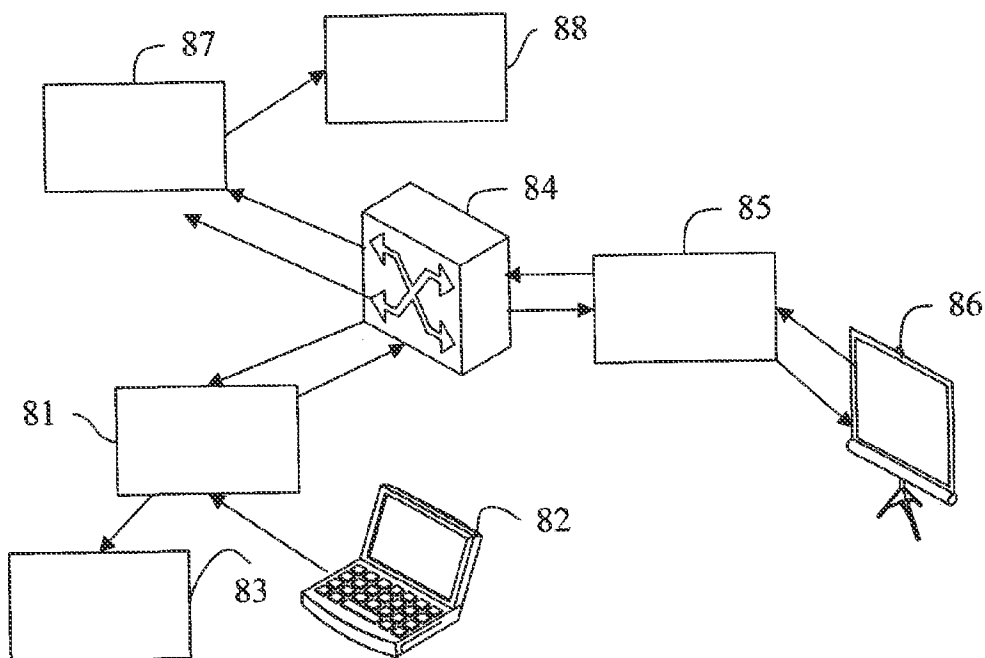


图 20

200910202849.6

说明书附图 第11/13页

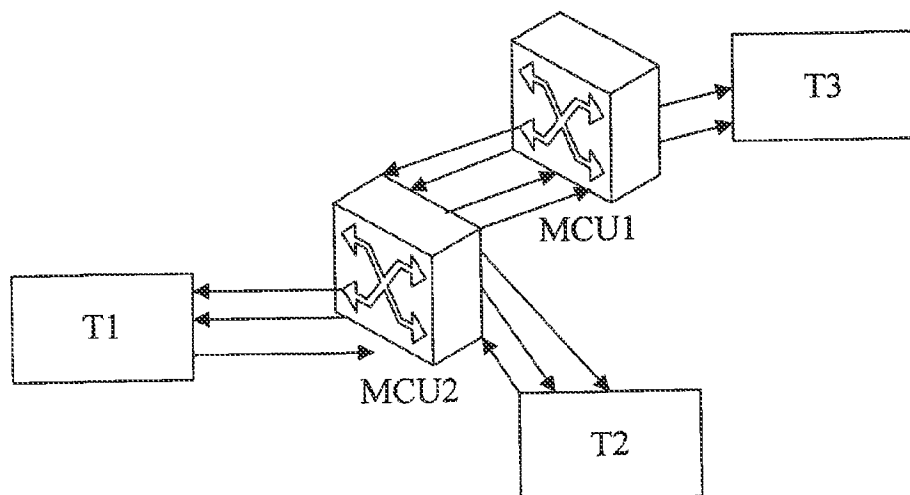


图 21

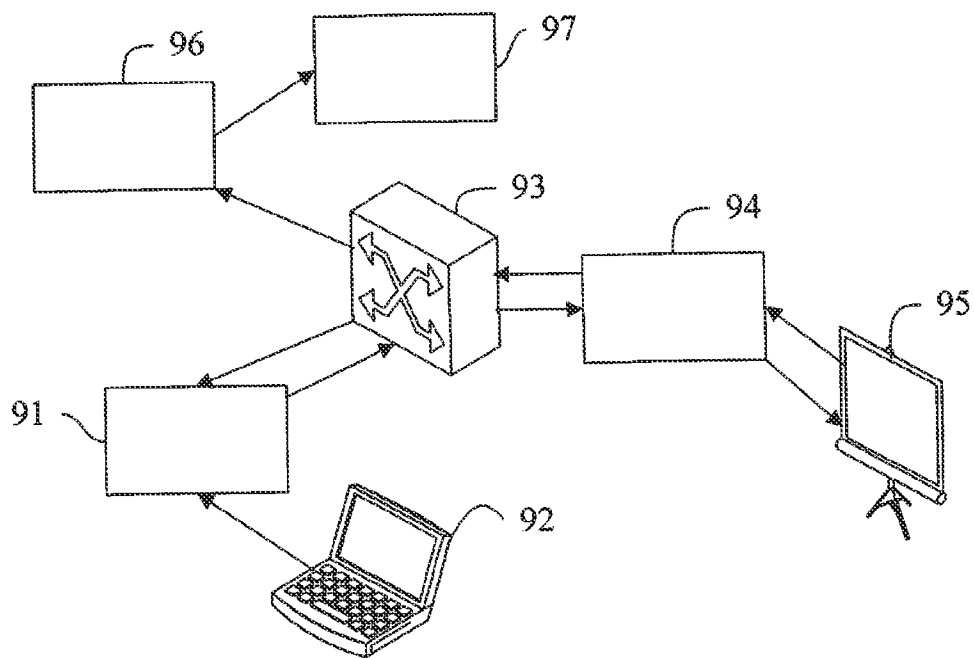


图 22

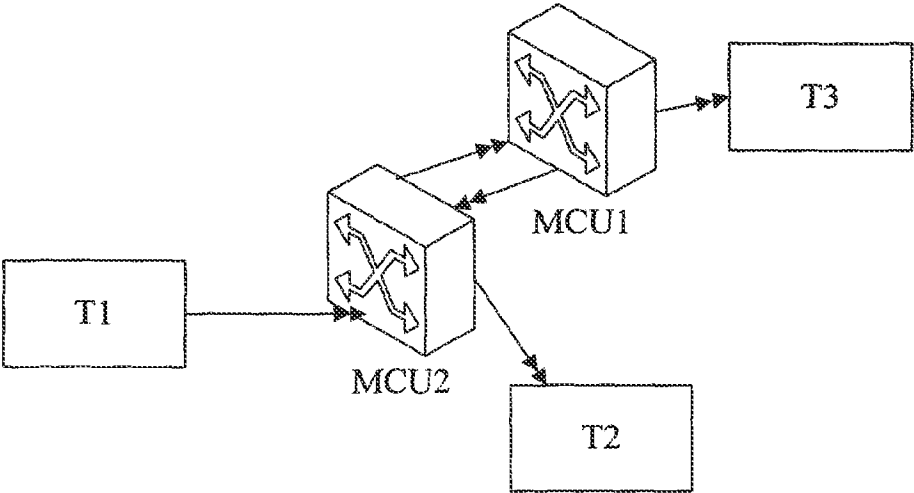


图 23

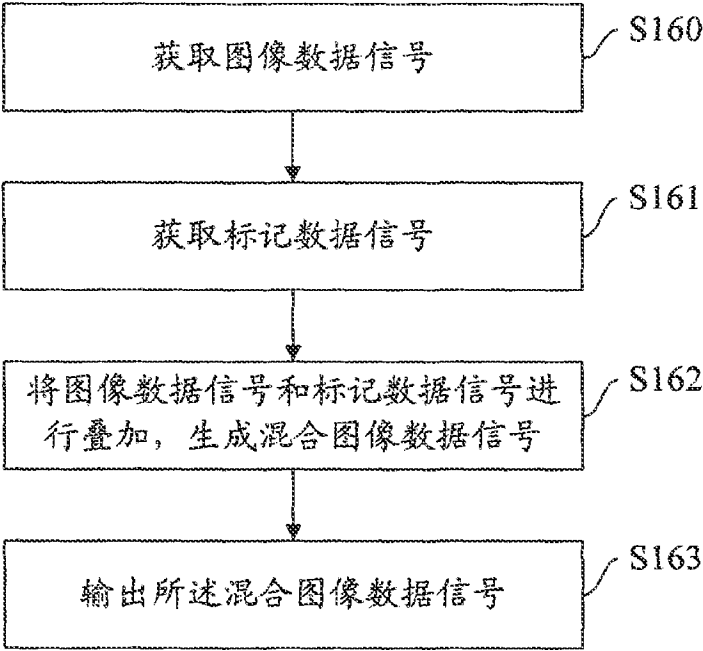


图 24

200910202849.6

说明书附图 第13/13页

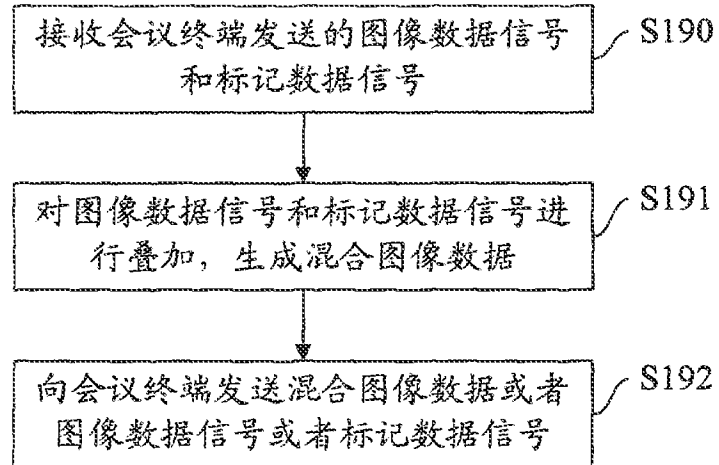


图 25

**Electronic Acknowledgement Receipt**

<b>EFS ID:</b>	43244750
<b>Application Number:</b>	16852790
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5321
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel
<b>Customer Number:</b>	52835
<b>Filer:</b>	Thomas Lee
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	21044.0006USC1
<b>Receipt Date:</b>	14-JUL-2021
<b>Filing Date:</b>	20-APR-2020
<b>Time Stamp:</b>	11:14:43
<b>Application Type:</b>	Utility under 35 USC 111(a)

**Payment information:**

Submitted with Payment	no
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**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_SB08_0006C.pdf	1034900	no	4
			3e440d37015f972a04dd0c3110574892372379bc		

**Warnings:**

Case 2:23-cv-00521-JRG-RSP Document 71-10 Filed 01/28/25 Page 808 of 1328

PageID #: 3923

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**CN1317112A Meeting system and information storage medium**

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**Technical field**

The present invention relates to a conference system and a conference information storage medium. Background technique

In the existing conference system, when the presentation is performed, the presenter uses a personal computer and a projector to demonstrate the audience at a certain venue.

However, in fact, in some cases, it is not only this one-way presentation, but the presenter who allows multiple people to write to the presentation screen or replay when the screen is written. Two-way communication with the demo recipient.

As a method of such playback, although a method of photographing and reproducing using a video recording device is also conceivable, in order to reproduce a scene in a conference or a portion such as a chapter in a presentation, it is necessary to perform reverse playback or Quick release, so lack of speed.

Further, if only the presentation data, that is, the data generated by the application software is used in advance, the reproduction of a part of the above is relatively easy, but it is practically impossible to reproduce the scene at the time of the presentation, for example, the operation of the pointing stick. Disclosure of invention

The present invention has been made in view of the above problems, and an object thereof is to provide a conference system and an information storage medium capable of immediately reproducing a past conference situation in accordance with an instruction.

In order to solve the above problems, a conference system of the present invention includes conference data generating apparatus that receives transmission data from a plurality of data transmission apparatuses via a transmission line and generates conference data reflecting the transmission data, and the conference system is characterized in that the conference data is generated. The apparatus includes, for storing the received transmission data for each of the data transfer devices, and storing the received transfer data in the storage device storing the predetermined presentation data and storing the storage from the storage device according to the regeneration instruction of each of the data transfer devices The device reads out data control means including conference data of at least a part of the transmission data and the presentation data.

In this way, the conference participant or the like can immediately replay the past conference data according to the instruction.

Further, by storing while managing each data transfer device, it is possible to determine from which data transfer device what transfer data is received.

Further, it is also possible to reproduce the conference data reflecting the transmission data of each data transmission device. Specifically, for example, when a plurality of conference participants transmit input data by their respective input devices, playback can be performed for each input device, that is, for each conference participant.

Here, as the reproduction instruction, specifically, for example, a reproduction instruction issued by a conference participant or a presenter by a predetermined reproduction instruction device may be used.

Further, it is preferable that the data control device stores the received transmission data while managing the predetermined transmission unit, and reads the conference data for each predetermined unit based on the reproduction instruction.



Here, as the predetermined unit, for example, a chapter unit, a unit of a chapter, a page unit, or the like can be used. That is, for example, if the conference participant issues a reproduction instruction in the second section of Chapter 3, the portion can be immediately reproduced.

Further, preferably, the conference data generating device includes an imaging device for imaging a conference situation, and the data control device stores the imaging data as the part of the conference data in the predetermined unit for each of the storage devices. The data control device reads the conference data stored in the storage device for each of the predetermined units in accordance with the reproduction instruction.

Here, as the meeting situation, for example, an image displayed by the narrator (presenter) or the conference participant with a pointing stick, a laser pointer or a finger on the front of the screen or on the tablet, an image reflecting the instructions, and the like may be used.

In other words, since the image to be captured includes not only the reproduced presentation data but also an image reflecting the instruction of the conference participant, the indication position and the instruction content can be immediately reproduced based on the imaging result, and the conference can be appropriately grasped. The meeting between the narrator and the conference participants to discuss each other.

Similarly, it is preferable to include a recording device for recording a conference situation, and the data control device stores the recorded data in the storage device as a part of the conference data for each predetermined unit.

Here, as the meeting situation, for example, it may be a speech or a conversation of a narrator or a conference participant. In this way, since the sounds can be combined and reproduced, it is possible to further appropriately grasp the situation of the meeting.

Preferably, the conference data generating device includes a playback device for reproducing the read conference data.

In this manner, the read conference data can be reproduced by display, projection, sound reproduction, etc., thereby enabling the conference participant to immediately confirm the conference data.

Preferably, the conference data generating device includes a transmission device for transmitting the read conference data to another processing device.

In this manner, reproduction, printing, and the like of the conference data can be performed by other processing means such as a display device, a printing device, or the like.

Preferably, the data transfer device includes a plurality of input devices, and the data control device preferably stores the transfer data transmitted from the input device for each of the input devices while storing the transfer data in the storage device. The conference data is read from the storage device in accordance with the above-described playback instruction.

In this way, playback can be performed for each input device, i.e., for each conference participant. Specifically, for example, it is possible to reproduce the conference data reflecting the data input by the conference participant using a mouse or a pen tablet, and to immediately confirm who performed what kind of operation.

Here, it is preferable that the conference data generating device includes a projector.

In this way, by using the projector, it is possible to realize a conference system that can be adapted even for a large conference.

Further, the information storage medium of the present invention stores information for receiving transmission data from a plurality of data transmission apparatuses via a transmission line and generating conference data reflecting the transmission data, and is readable by a computer, and the above information preferably includes a presentation. Information for storing storage information stored in the storage device while managing the transmission data by each of the data transfer devices, and for reading the transfer data and the presentation for the presentation from the storage device according to the playback instruction. Information for reading the conference data of at least a part of the information.

According to the present invention, the conference participant can immediately replay the past conference data in accordance with the instruction.

Further, it is preferable that the read information includes information for reading the conference data stored in the storage device for each of the data transfer devices in accordance with the playback instruction.

In this way, it is possible to discriminate from which data transmitting device what kind of transmission data is received.

In addition, it is also possible to reproduce the conference data reflecting the transmission data of each data transmission device. Specifically, for example, when a plurality of conference participants transmit input data using their respective input devices, playback can be performed for each input device, that is, for each conference participant.

Further, preferably, the information includes information for capturing a situation of the conference, and the storage information includes information for storing the image data as a part of the conference data in the storage device in a predetermined unit, wherein The read information includes information for reading the conference data stored in the storage device for each of the predetermined units in accordance with the reproduction instruction.

Here, as the meeting situation, for example, an image displayed by the narrator (presenter) or the conference participant with a pointing stick, a laser pointer or a finger on the front of the screen or on the tablet, an image reflecting the instructions, and the like may be used.

In other words, since the image to be captured includes not only the reproduced presentation data but also an image reflecting the instruction of the conference participant, the indication position and the instruction content can be immediately reproduced based on the imaging result, and the conference can be appropriately grasped. The meeting between the narrator and the conference participants to discuss each other.

Similarly, it is preferable to include recording information for recording a conference situation, and the storage information preferably includes storing the recorded data in the storage unit for each predetermined unit as part of the conference data. Information.

Here, as the meeting situation, for example, it may be a speech or a conversation of a narrator or a conference participant. In this way, since the sounds can be combined and reproduced, it is possible to further appropriately grasp the situation of the meeting.

Here, as the predetermined unit, for example, a chapter unit, a unit unit, a page unit, or the like can be used. That is, for example, if the conference participant issues a reproduction instruction in the second section of Chapter 3, the portion can be immediately reproduced.

Preferably, the above information includes information for reproducing the read information.

In this manner, the read conference data can be reproduced by display, projection, sound reproduction, etc., thereby enabling the conference participant to immediately confirm the conference data.

Preferably, the above information includes information for transmitting the read information to other processing devices.

In this manner, reproduction, printing, and the like of the conference data can be performed by other processing means such as a display device, a printing device, or the like. Brief description of the drawing

Fig. 1 is a schematic diagram of a conference system according to an example of the embodiment.

Fig. 2 is an explanatory diagram of a conference situation in an example of the embodiment.

Fig. 3 is a block diagram showing a configuration of a conference system according to an embodiment of the present invention.

4 is a schematic diagram showing an example of a data structure of a conference data and a management table according to the embodiment.

Fig. 5 is a flow chart showing the flow of processing in the conference system according to an example of the embodiment.

Fig. 6 is a functional block diagram of a conference system according to another example of the embodiment.

Fig. 7 is a functional block diagram of a conference system according to another example of the embodiment.

Figure 8 is a simplified diagram of a conference system employing a control device.

Fig. 9 is a flow chart showing the flow of processing in the conference system using the control device.

FIG. 10 is a diagram showing an example of a management table.

Fig. 11 is a view showing image display when image display is performed in a distributed manner, wherein (A) is a view showing an image display example when only one liquid crystal projector is used, and (B) is a view showing four liquid crystal projections. The image of the machine is shown in the figure.

Fig. 12 is a view showing a state in which image display is performed in a distributed manner using four liquid crystal projectors.

FIG. 13 is a schematic diagram showing a communication method when a virtual machine is used. (A) is a view showing a conventional communication method, and (B) is a view showing a communication method according to the present embodiment.

Fig. 14 is a functional block diagram at the time of performing the dispersion processing of the embodiment.

Fig. 15 is a functional block diagram of a software unit and a hardware unit in the projector.

Fig. 16 is a functional block diagram of an information storage medium according to an example of the embodiment. Best form for implementing the invention

#### [Embodiment of the Invention]

Hereinafter, a preferred embodiment of the conference system of the present embodiment will be described with reference to the drawings.

As the conference system of the present embodiment, for example, a conference system in which a plurality of display devices and input devices are connected by a communication line or a system bus having bidirectional connectivity is provided. More specifically, for example, there is a conference system in which a conference participant instructs the projection or display screen of the display device while another conference participant uses the input device to attach information to the image displayed on the screen. A conference system that can be used in a remote area even if it is used as a single system and that synchronizes the conference systems through communication paths, so that participants who are far apart can participate in the same conference to support the conference. System, etc.

(Note on the structure of the conference system)

Fig. 1 is a schematic diagram of a conference system according to an example of the embodiment.

As shown in FIG. 1, the conference system includes, in structure, an input device 400, an output device 600, and conference data having both functions as a conference data generating device for generating conference data and a function as a conference data reproducing device for reproducing conference data. The processing device 2 and the processing device 700 are connected to each other by an IEEE 1394 bus 300 which is a high speed transmission line.

The conference data processing device 2 performs transmission and reception of transmission data with the processing device 700 in addition to receiving transmission data from the input device 400, generating

conference data based on the transmission data, and transmitting the generated conference data to the output device 600.

Specifically, the input device 400 may be, for example, a tablet, a mouse, a keyboard, a scanner, a digital camera, a portable information terminal, a portable telephone, a pointing stick, or the like. The information (transmission data) transmitted from the input device 400 to the conference data processing device 2 may be, for example, coordinate information digitized by the tablet, and information obtained by digitizing the movement track of the pointer on the tablet. The information after the coordinate of the mouse device is coordinated, the text information input through the keyboard, the collected pixel information, the digitized sound information, and the like. Further, as the output device 600, for example, a display, a portable information terminal, a printer, or the like can be used.

Further, the conference data processing device 2 may be, for example, a liquid crystal projector or the like, and the processing device 700 may be, for example, a PC (Personal Computer), a WS (Workstation), an NC (Network Computer), a service device, a host device, or the like.

That is, these devices constitute a conference system in which a plurality of conference participants use at one site and generate and reproduce conference data by associating these devices with each other.

Further, the processing device 700 of a computer such as a PC is not a configuration necessary for the conference system, and as a component of the processing device 700, there are a processor, a ROM, a RAM, a secondary storage device, etc., but these elements can also be regarded as A part of the components of the conference data generating device. The processing device 700 is housed in another housing in consideration of the overall portability and reusability of the device, and thus the processing device 700 is described in a separate form.

The conference system is not only suitable for small meetings for meetings around a table, but also for meetings where multiple devices in remote areas are interconnected, such as meetings between countries.

First, an embodiment in a small conference centered on one liquid crystal projector will be described, and then an embodiment in a conference between distant regions in which a plurality of devices are associated will be described.

(Description of the meeting situation)

Fig. 2 is an explanatory diagram of a conference situation in an example of the embodiment.

Here, the conference data 44 shown in FIG. 1 is projected onto the screen 1020 by the liquid crystal projector 200 as the conference data processing device 2, and the presenter 1000 performs the presentation using the pointer 1010.

On the other hand, the conference participant 1002 inputs data using the tablet 410 as the input device 400. The input data is transmitted to the communication interface unit 30 of the liquid crystal projector 200 via the IEEE1394 bus 300, and the liquid crystal projector 200 projects the instruction data 1012 constituting a part of the conference data 44 based on the transmitted data.

Here, the instruction data 1012 may be, for example, character data in which a character is written on a part of the projected image, graphic data in which a graphic is written on a part of the projected image, and in the projected image. The underlined data of the underlined text, the circled data of a part of the projected image surrounded by a circle, and the like.

The conference participant 1002 can see the indication data 1012 input by the tablet 410 in addition to the presentation data.

In the case of an actual meeting, sometimes it is sometimes desirable to see the first few chapters of the specially designated demo data and also include the actions of the presenter 1000, or sometimes to confirm the meeting participants, even during the progress of the meeting. The location indicated by 1002, etc.

In this case, if you are using the demo data generated by the PC application and only the demo data, you can specify and regenerate the sections of the chapters. However, this method cannot reproduce the information and the additional time added by the conference participant 1002 with the tablet 410.

In addition, although it is possible to photograph and reproduce the entire conference using a video recording device or the like, it is necessary to take time to perform fast playback or reverse playback in order to specify the sections of the first chapter and reproduce them. When a conference participant is present, it is impossible to reproduce only the location indicated by the specific conference participant 1002.

If you can achieve the above ideas, you can effectively conduct meetings in a variety of ways.

In order to realize the above-described concept, as shown in FIG. 1, the liquid crystal projector 200 of the present embodiment records and digitizes a conversation in a conference by using an image captured by an image or the like instructed by a narrator or the like. The recording unit 70, the input device 400, and the like add information to the presentation data generated by the processing device 700 as the PC, and combine this information with the address assigned to each device and manage it by the management table 42 as the conference data 44. It is stored in the storage unit 40.

Hereinafter, the conference system of the present embodiment will be described more specifically.

Fig. 3 is a block diagram showing a configuration of a conference system according to an embodiment of the present invention.

As shown in FIG. 3, when the data input is performed by the conference participants 1001 to 4, respectively, by the conference participants 1002 of the four individuals, the input data is stored in the storage unit 40 for each of the graphics input boards 410.

Similarly, the speech of the presenter 1000 as the narrator is recorded by the recording unit 70, and the conversation or speech of the meeting participant 1002 is collected by the sound digitizing device 72 used as the recording device set for each meeting participant 1002, and The sound recording data is stored in the storage unit 40 in accordance with the presenter 1000 and each meeting participant 1002.

The recording unit 70, the audio digitizers 72-1 to 4, and the tablet 4101 to 4 are assigned device addresses that are not duplicated.

Further, part of the voice information is voice-recognized based on a predetermined keyword registered in advance. The voice recognition result is subjected to character code conversion and recorded as additional information to the conference data, or as a device control command. In the latter case, terms such as "fast release" and "reverse" registered in advance are translated into control commands for controlling the operation of the liquid crystal projector 200, and are input to the control unit 90 shown in FIG.

Further, the conference data 44 generated and stored in the storage unit 40 by the generating unit 10 shown in FIG. 1 is reproduced by the reproducer 20 shown in FIG. 1 for each presenter 1000 and each conference participant 1002.

The conference data will be described in detail below.

(Description of meeting data)

FIG. 4 is a schematic diagram showing an example of the data structure of the conference data 44 and the management table 42 of the present embodiment.

The conference data 44 is an electronic file containing a plurality of data fields from the [Conference Data Start] mark to the [Conference Data End] mark.

In addition, the conference data 44 includes fixed presentation data 1420 prepared in advance and variable additional data 1440 that changes as the conference situation changes. The presentation data 1420 is generally managed by the file system of the OS of the PC and held in the storage unit 40 as a secondary storage device.



On the other hand, the additional data 1440 is managed by the control unit 90 that operates by the function of the built-in OS of the liquid crystal projector 200, and is stored in the storage unit 40.

Further, the conference data 44 is identified by a label according to each predetermined unit of the conference.

Here, the predetermined unit may be, for example, a chapter unit, a unit of a chapter, a page unit of a single page displayed, or the like. For example, when units such as chapter units and section units are used, the first few chapters of the chapters can be indicated, so that a particularly effective indication can be made in the demonstration.

As shown in FIG. 4, the presentation data 1420 of the present embodiment is assigned a reference numeral in various units such as the first chapter, the first section, and the first page. Further, a pointer to the address of the image data of the additional data is also provided to the [image] mark or the like of the presentation data 1420, and as a result, the entire chapter data 42 can be specified by specifying the first chapter and the The pages and pages read their data. In the figure, in addition to the arrow of the symbol, the arrow also indicates an example of the position of the pointer and the portion of the indication.

Further, for example, when a unit such as a page unit is used, it corresponds one-to-one with the distribution unit of the print material. In the demonstration using a PC, it is possible to add moving image or sound recording data to a single page portion, but at this time there is always a frame forming a page, which can be interpreted as being included in a part of the data forming the frame. The part that includes the action.

In a well-known technique in the field of PC printing, a language (page description language) that can describe a document genre and print information is used, and one of the widely popular ones is the PostScript language of Adobe. If the description of the conference data 44 is in the PostScript language, it is easy to understand. In other words, a method of describing image information, character information, and the like in units of pages in a program language can be employed.

In this programming language, a description including pixels can be performed based on a set of pixels. In the description language of the conference data 44, this concept is further extended by the fact that the portion of the reproduced sound and the portion of the reproduced moving image can be included by the program description. As a well-known example of processing a general-purpose programming language using an interpreter, there is a BASIC language. Although the BASIC language differs from the PostScript language in that it does not include a concept of describing an image in units of pages, it is suitable for sound data. Regeneration, reproduction of moving images, etc.

In the present embodiment, the JAVA language is merely cited as an interpreter language having a few features on both sides. In the case of the JAVA language, for example, an abstract drawing with AWT (Abstracted Window Tools) and Swinng is not limited by the processing system. JAVA is a trademark of Sun Microsystems, Inc. of the United States.

The application software uses the classification function to implement the functions for performing the required processing.

For example, when it is desired to use the line generation function in the drawing category, a command word for executing the line generation function is requested to generate a message addressed to the above category. When the program containing the command word is executed, for example, if the JAVA virtual machine is mounted as the virtual machine 500 in the conversion unit 50 shown in Fig. 1, straight line pixels can be drawn on any processing system. Similarly, if an image generating program that performs drawing multiple times per unit time is provided, the moving image can be reproduced.

In addition, in the sound data, the processing of the sound collection data is also described in the JAVA language.

These programs are developed and stored at source code levels, which are known as so-called high-level languages, which are described by character codes. The description of the conference data 44 is not limited to the JAVA language. For example, various high-level languages such as the PASCAL-based language in the applicant's Japanese Patent Laid-Open No. Hei 6-4498 can also be used.

Further, as disclosed in Fig. 1 of Japanese Patent Laid-Open No. Hei 6-4498, the program described in the above high-level language is converted by the compiler into an intermediate language object which can be interpreted and executed by the intermediate language interpreter. In the present embodiment, the intermediate language object generated by the above program is used as the conference data 44.

In Fig. 4, the [page start] mark to the [page end] mark are units related to one single page. In this one processing unit, an [image] mark and a [sound] mark are stored. [Image] is marked as a series of labels of variable length fields. In the variable length field, as described above, the drawing command is stored in the intermediate language description generated based on the result of the compilation in the high-level language description. In addition, still image data represented as a set of pixels is also stored in the variable length field by combining with the pixel transfer drawing command.

For the [sound] tag, the data is also stored in the variable length field.

In addition, the demo data 1420 and the additional data 1440 of FIG. 4 can be rewritten in the same manner as an electronic file on a general computer.

The rewritten portion of the additional data 1440 is stored in the variable length data portion enclosed by the [Additional Data Start] flag to the [Additional Data End] flag. In the variable length data portion, image data added by a tablet or the like and sound data added by a microphone or the like are stored.

The image data is stored between the [image data start] mark and the [image data end] mark, and the sound data is stored between the [sound data start] mark and the [sound data end] mark.

Further, in the present embodiment, the data after appending the original presentation data (presentation data 1420) to the various additional data 1440 attached during the conference is referred to as conference data 44 to be distinguished from the original presentation data. Both types of data are electronic files that can be processed by a computer.

Specifically, the sound data input to the sound digitizing device 72 is amplified by the transmission amplifying unit incorporated in the sound digitizing device 72 to an identifiable level, and then collected by the sampling processing unit installed in the sound digitizing device 72 as Digital signal. This data is stored in the storage unit 40 by the control unit 90 as additional data 1440 which is a part of the conference data 44 based on the application software.

In the storage unit 40, in addition to the presentation data 1420 and the additional data 1440 transmitted, the management table 42 for data management used by the control unit 90 is stored.

The management table 42 is a table for identifying and managing devices such as the input device 400, and includes an ID for identifying the device, a device name, and data for identifying a user of the device.

For example, the result of the presenter 1000 operating with the indicator stick 1010 is stored in the storage unit 40 as part of the additional data 1440. Since such image data is stored in a combination with the device ID, for example, when the action of the presenter 1000 is reproduced, the image data stored in the additional data 1440 can be reproduced by being searched from the management table 42.

Further, by adding the time data as the additional data 1440 to the image data, the conference data 44 can be reproduced by specifying the time.

Thus, according to the present embodiment, the conference situation can be immediately reproduced according to the designation of the chapters, and the conference situation can be selectively reproduced according to the individual designation or the time designation of the presenter 1000 or the conference participant 1002.

Hereinafter, the task of the input device 400 will be described. The tablet 410, which is one of the input devices 400, structurally includes a digitizing unit, a coordinate detecting processing unit, an I/O controller, and an IEEE 1394 bus level driver.

The I/O controller of tablet 410 has the target side node capability of the SBP-2 protocol. On the other hand, the I/O controller of the liquid crystal projector 200 controls the SBP-2 driver having the capability of the startup side node of the SBP-2 protocol.

The storage unit 40, which is the local memory of the liquid crystal projector 200, is opened to the IEEE1394 bus 300 as a shared memory by the SBP-2 driver.

The bus-level transaction specified by IEEE 1394-1995 is performed between the IEEE 1394 bus-level driver on the side of the tablet 410 and the IEEE 1394 bus-level driver on the side of the liquid crystal projector. Through this transaction processing, the tablet 410 logs in the SBP-2 driver through the IEEE bus level driver and obtains access permission to the above shared memory space.

In the case where the registration is permitted, the storage unit 40 as the shared storage space on the liquid crystal projector side can be accessed by the tablet 111 before the tablet 410 is deregistered by the IEEE 1394 bus driver.

After the positional detection of the instruction operation by the conference participant 1002 on the image input board 410 by the digitizing means, the coordinate detection processing unit performs relative position conversion, and converts it into the indication coordinates and a series of trajectory data. The indication coordinate data and the trajectory data are stored in the shared storage space provided by the liquid crystal projector 200 by the operation of the SBP-2 protocol described above.

The shared memory space, when viewed from the liquid crystal projector 200, is the local storage space. Therefore, the liquid crystal projector 200 can allocate or copy the shared space to the storage space managed by the process or thread of the virtual machine 500 through the core program of the built-in OS as needed. As can be seen from another point of view, the trajectory of the user's indication action on the tablet 410 can be monitored (monitored) by the process or thread of the virtual machine 500 of the liquid crystal projector 200 at any time.

Hereinafter, the conference data generation processing in the actual conference system will be described.

(Note on the handler in the conference system)

Fig. 5 is a flow chart showing the flow of processing in the conference system according to an example of the embodiment.

When the meeting starts, the meeting data generation process is started, and the meeting data generation process is performed until the end of the meeting.

First, after the start of the conference, if the conference has not ended (step 2), the conference unit 44 stores the conference data 44 in the storage unit 40 (step 4).

When the presentation data generated by the PC or the like is stored in the storage unit 40 (step 6), the reproduction unit 20 reproduces the presentation data 1420 read from the storage unit 40 by the control unit 90 (step 8).

That is, the presentation data is projected by the liquid crystal projector 200, and when there is sound, the sound is also reproduced.

When there is no demo data (step 6), no external operations are performed, but internal processing continues.

When there is external input data (step 10), the control unit 90 stores the input data for each input source and stores it in the storage unit 40 (step 12).

Specifically, for example, when the transfer data including the drawing instruction information and the like transmitted from the tablet 410 is transferred, not only the transfer data but also the identification information of the tablet 410 and the like are stored, thereby using the management table. 42 is stored while managing each input source.

Further, a part of the transmission data or the like is stored as the additional data 1440. The additional data 1440 includes not only the data input from the tablet 410 but also the image data included in the imaging range 1060 of the imaging unit 60 shown in FIG. 2. That is, the presenter 1000 stores the position data of the image indicated by the pointing stick 1010 or the finger as the additional data 1440.



The conference data 44 is generated in the above manner.

When there is no external input data (step 10), no external operations are performed, but the internal processing is continued.

When the conference participant 1002 issues a reproduction instruction by operating a remote control or the like reproduction instruction device (step 14), the control unit 90 reads the conference data 44 for each predetermined unit in accordance with the designation of the reproduction instruction (steps 16 to 20). ).

For example, if the reproduction indication is a designation for each input source (step 16), the conference data 44 is reproduced for each input source (step 18).

Further, if the reproduction instruction is not specified for each input source (step 16), the conference data of the designated portion is reproduced (step 20). Specifically, for example, the control unit 90 determines that the first few chapters corresponding to the presentation data 1420 are designated, and reads the conference data 44 corresponding to the portion from the storage unit 40. Therefore, if the reproduction unit 20 reproduces the portion, the data of the designated portion can be reproduced.

Of course, not only is each input source or a specified part of the alternative, but the two kinds of designations can also be combined to select both at the same time.

The conference data generation processing and the reproduction processing are performed as described above. The above is the case where the tablet 410 is used as the input device 400, and the case where the PC 420 is used as the input device 400 will be described below.

(Example of a conference system when a PC is used as an input device)

Fig. 6 is a functional block diagram of a conference system according to another example of the embodiment.

The liquid crystal projector 202 is connected to the external storage device 240 via the IEEE1394 bus 300, and the liquid crystal projector 202 and the PC 420 are connected via the optical fiber network 310.

This type of conference system is used when connecting meetings between regions that are far apart. Here, it is assumed that a drawing command is issued from the PC 420 provided in the United States to the liquid crystal projector 202 provided in Japan.

In other words, in the illustrated example, the presentation was performed by the liquid crystal projector 200 in the meeting place in Japan, and the conference participant 1002 in the US performed the presentation image generated by the Japanese liquid crystal projector 200 while displaying the presentation screen by the PC 420. Write.

Here, the PC 420 includes a Web browser with a display presentation screen, OS (Operating System), TCP/IP (Transmissive Control Protocol/Internet Protocol), PPP (Point to Point Protocol), and a point-to-point protocol. The software control unit 422 and the transmission/reception unit 424 having an ATM switch.

Further, the liquid crystal projector 202 includes a CGI (Common Gateway Interface), a httpd (Hyper Text Transfer Protocol Daemon), a drawing API (Application Programming Interface), and the like. The software generation unit 12, the conversion unit 52 having the virtual machine 502, the control unit 92 having distributed OS core programs, software such as TCP/IP, PPP, and device driver, the transmission/reception unit (including the ATM switch), and the IEEE 1394 bus. The interface unit 32 for communication of the level driver.

Further, the external storage device 240 includes a control unit 290 and a communication interface unit 292 having an IEEE1394 bus level driver or the like.

Hereinafter, the conference data generation processing in the conference system will be described.

First, in the United States, in the state where the presentation image is displayed on the screen of the PC 420, the conference participant 1002 operating the PC 420 performs an operation for writing the presentation image on the web browser of the screen.

The operation command is converted by the control unit 422 into a form based on a protocol such as TCP/IP, and the transfer data including the operation command is converted into a form that can be converted by the compiler into a data form in which the conference data can be generated, and transmitted. The receiving unit 424 transmits the liquid crystal projector 310 to the liquid crystal projector 202.

In the liquid crystal projector 202, the transmission data transmitted by the communication interface unit 32 is received, and the control unit 92 performs transmission control and the like. The transmitted transmission data is converted into a form in which conference data can be generated by the virtual machine 500, and the generation unit 12 generates conference data.

The transmission data transmitted from the PC 420 and the generated conference data are transmitted from the communication interface unit 32 to the external storage device 240 via the IEEE1394 bus 300, and are controlled by the control unit 290 for each processing device and each of the external storage devices 240. The predetermined units are stored while managing the transmission data and the conference data received by the transmission/reception unit 292.

Further, the generated conference data is displayed by the liquid crystal projector 202 at the venue in Japan, and is transmitted from the communication interface unit 32 to the PC 420. In the PC 420, the received conference data is displayed again on the screen.

Although the above-described transmission/reception processing and data transmission are large data such as transmission of conference data, the IEEE 1394 bus 302 and the optical fiber network 310 are used, so that the transmission can be performed at an extremely high speed.

According to the above-described manner, the conference participant 1002 in the United States can operate the liquid crystal projector 202 from a far distance from the same feeling as the operation of the liquid crystal projector 202 in the Japanese venue.

Further, the transmission data and the conference data are stored in the external storage device 240, and the PC 420 and the external storage device 240 are also connected by the high-speed transmission line. Therefore, it is possible to immediately reproduce the required portion in response to the operation from the PC 420.

Therefore, it is possible to realize a conference system that can quickly replay conference data even when a conference is held between regions that are far apart.

Further, by separately setting the external storage device 240 storing the conference log (history record) and the projector 202, even if the hard disk constituting the external storage device 240 is a RAID (Redundant Array of Inexpensive Disks) structure, When the reliability of data is improved and a large-capacity storage capacity is secured, the versatile liquid crystal projector 202 can be realized without changing the size of the liquid crystal projector 202 itself.

Even when the storage device for storing the conference data and the liquid crystal projector 202 are separately provided as described above, since the communication between the liquid crystal projector 202 and the external storage device 240 can be performed at an extremely high speed, there is almost no existence. Performance issues.

The above is an example in which the PC 420 is used as the input device 400. Hereinafter, a case where the service device is used as the data transfer device to transfer the transmission data will be described.

(Example of a conference system when a service device is used as a data transmission device)

Fig. 7 is a functional block diagram of a conference system according to another example of the embodiment.

The conference system in this embodiment structurally includes a liquid crystal projector 200 and a service device 100 for reproducing conference data.

The liquid crystal projector 200 is the same as the liquid crystal projector 200 described above.

The service device 100 includes a storage unit 102 that stores display data, control data, component objects, and the like, a transmission/reception unit 104, and a control unit 106 that controls data transmission between the storage unit 102 and the transmission/reception unit 104.

Here, the display data may be, for example, image data, presentation data, conference data, etc., and the control data may specifically be, for example, a device driver, data for specifying a drawing range such as coordinates, or the like. Drawing data such as lines or circles, etc.

In particular, in view of the fact that image data is generated in two forms, it is necessary to design a processing system. The first form is that the entire image is generated as a set of pixels. When a photo of a natural image is acquired by an image scanning device, each pixel is defined as color data accompanied by a different gray level, and the image as a whole is defined as a set of the pixels.

The second form is to generate pixels from any of the command words. In a processing system that uses a combination of a straight line, a Bezier curve, an arc, and the like to represent a figure, a line generation command (usually specifying a drawing start coordinate, a terminating end coordinate, and a line width) is performed according to the resolution of the processing system as an object. The degree or coordinate system produces a list of points and forms pixels to draw a portion of the graph.

In most cases, an image display system of a computer device uses a set of pixels of the former to represent graphics while using the latter command words to represent graphics. In addition, the way in which the outline glyphs are used to generate text, since the original text shape is made up of straight lines? The curve drawing command is described, so it is an example of the latter. As will be described later, the generation of pixels based on the command word is an application example in which a plurality of liquid crystal projectors are used to draw over a wide area, and is a preferable example in which dispersion processing is required.

When a pixel is generated according to any drawing command, it is necessary to have a program for performing the operation, and the program must be in a form that can be executed on hardware including the processor as an object. In the present embodiment, the execution unit of such a program is referred to as a "component object".

A component object that is used as part of the software for image generation or reproduction. Specifically, for example, it may be a JAVA applet or JAVA Beans.

For example, it is assumed that the service device 100 is a web server, and is a form in which various data for conference data generation is stored in the storage unit 102.

The liquid crystal projector 200 can download a device driver, a JAVA applet, or the like from the service device 100.

In this way, the function of the liquid crystal projector 200 can be easily expanded. That is, when it is necessary to hold a new form of meeting, the organizer of the meeting stores necessary information in the service device 100, and the meeting participant 1002 can load necessary information from the service device 100 into the liquid crystal projector 200, thereby enabling Quickly adapt to new forms of meetings.

Specifically, for example, when the liquid crystal projector 200 currently has a function of drawing a line on a part of the screen, a component object having a function of enclosing a part of the screen with a circle is received and loaded into the conference data generating program. You can add a function to surround a part of the screen with a circle.

Further, since the function can be expanded by software instead of hardware, the liquid crystal drive circuit and the like can be simplified. That is, in general, in a liquid crystal projector, image data is converted into a digital signal by an AD converter, and image information is stored in a first frame memory. Then, the image information is convoluted by the digital filter circuit and stored in the second frame memory. Next, the image data in the second frame memory is read out at a certain period so as to be displayed on the liquid crystal light valve by the liquid crystal controller.

Further, here, the convolution operation refers to an image filtering technique for changing the tap coefficients in accordance with the sharpness of the image, thereby changing the image quality.

In these drive circuits, image deterioration due to phase difference is caused by the difference in input image data, and in order to reduce the phase difference, a high-performance PLL circuit must be employed. Further, in the case where a plurality of liquid crystal projectors having different resolutions are connected to each other, it is necessary to provide a scaling circuit for image processing for image interpolation. However, such image processing will deteriorate the image.

On the other hand, if the application software for operating the respective units of the liquid crystal projector 200 equipped with the virtual machine 500 is used as the embodiment, and the image data input to the liquid crystal projector 200 is converted based on the number of pixels of the liquid crystal, image deterioration due to image processing by the scaling circuit does not occur, and since it is not necessary to provide a plurality of frame memories, the circuit configuration can be simplified.

As such an application software, for example, the display image of the input image data is developed by the virtual machine 500 in a VRAM (Video RAM) and the display image in the VRAM is displayed on the liquid crystal panel through the liquid crystal controller. Processing software.

Although the liquid crystal projector 200 and the input device 400 have been mainly described above, the same operational effects can be obtained for the liquid crystal projector 200 and the output device 600.

That is, for example, the conference data is generated by the liquid crystal projector 200, and the generated conference data is transmitted from the communication interface unit 30 to the output device 600.

Here, when the printer 600 is used as the output device 600, the conference participant 1002 can print the conference data in accordance with the output instruction.

Further, when the display device 600 is used as the output device 600, for example, the conference participant 1002 can display the conference data based on the output instruction.

The output instruction in this case may be performed for each input device 400 and each predetermined unit, and the conference participant 1002 may immediately obtain the conference data requested by himself according to the instruction.

As described above, although the conference system can be constructed mainly with the liquid crystal projector 200, a new form of conference system can be realized by using a control device.

(Example of a conference system using a control device)

FIG. 8 is a simplified diagram of a conference system employing a control device 900.

One control device 900 and a plurality of processing devices that perform conference data processing are connected via a network including an IEEE1394 bus 300 as a transmission line, and transmission and reception of transmission data are performed between the respective processing devices to generate conference data.

The control device 900 includes a storage unit 910, a management unit 920 that manages data in the storage unit 40 while managing the connection state of each processing device and the network, and a transmission for controlling transmission of data in the control device 900. Control unit 930.

Further, as the processing device, for example, various devices such as the portable information terminal 402, the scanner 404, the liquid crystal projector 200, the PC 400, and the printer 602 can be used.

In this form, the processing of the conference data is performed as follows.

FIG. 9 is a flow chart showing the flow of processing in the conference system using the control device 900.

Initially, the control device 900 is activated and connected to the IEEE1394 bus 300, and other devices are also connected to the IEEE1394 bus 300. (Step 32).

When a certain processing device is connected, the transmission data including the packet indicating the state after the connection and the service provided by the processing device is transmitted to the control device 900. Here, the term "service" refers to the function provided by each processing device.

When the control device 900 receives the transfer data including the packet, the management unit 920 confirms that the registered service has been completed in the management table stored in the storage unit 910 (step 34), and if the same service is registered, Then, the priority and the like are adjusted (step 36).

The management unit 920 registers the provided service in the management table after confirming the provision of the service (step 38).

FIG. 10 is a diagram showing an example of the management table 912.

In the management table 912, an ID for identifying each processing device, a service provided by the processing device, and a state of the processing device are mainly stored. This identification ID assigns an ID value that is not repeated even when a plurality of processing devices are connected to the network.

When receiving the transmission data including the packet indicating the service request (step 40), the control unit 900 searches the management table 912 to search for a processing device that can provide a service that can respond to the service request.

For example, when a request for printing a part of the conference data is issued from the portable information terminal 402, the control device 900 searches the management table 912 with the management unit 920 to search for a processing device that can provide a print service, when searching for the service is provided. When the printer 602 confirms its status and is in a state in which processing is possible, the transfer control unit 930 establishes a connection between the portable information terminal 402 requesting the service and the printer 602 that responds to the service.

Once the connection is established, transmission data such as conference data can be transmitted and received between the processing device that issued the request and the processing device that responds to the request without having to pass through the control device 900.

In this case, for example, after the connection is established, a part of the conference data is transmitted from the portable information terminal 402 to the printer 602, and the print service is provided by the printer 602 (step 42).

Thus, by adopting the control device 900, it is possible to realize a conference system capable of unitarily managing the service and flexibly changing the processing device in accordance with the situation of the applied conference.

Even in such a conference system, it is preferable to install the virtual machine 500 in the control device 900 and each processing device. The reason for this is that by using the virtual machine 500, the model of the destination end or the OS or the like can be completely ignored when transmitting the transmission data, so that the degree of freedom of the device structure can be increased, and more diverse conferences can be performed.

As a technique for connecting the above-described control device 900 to a plurality of processing devices, for example, Jini of Sun Microsystems, Inc., in the present embodiment, the conference data 44 shown in FIG. 4 can be stored in the storage unit 910 of the control device 900 and It is completely different from Jini in that it can be updated and managed.

In the example described above, an example in which one processing device provides one service has been described. However, a case where a plurality of conference data reproducing apparatuses provide one service, that is, while distributing the conference data while performing distributed processing, will be described. .

(Description on Dispersion Processing)

Most of the current application software developed under the OS of a commercial PC is compiled and translated into a mechanical language that can be directly interpreted by a microprocessor. In this method, it is generally necessary to consider the architecture of the microprocessor using the application software and the inter-program interface with the service routines of the OS from the development stage of the application software (generally called API: Application). Programming Interface; and programming.



However, in the conference system of the present embodiment, the conference data 44 or the original presentation data is translated and executed centering on the liquid crystal projector 200 or the PC or WS serving as the processing device 700.

The liquid crystal projector 200 can not be limited to a certain microprocessor at the time of design, even when it is actually commercialized, even if it is provided to the user at an appropriate price, and the processing device 700 can be said to be the same. of. Further, as the processing device 700, not only a PC or a WS but also a portable information terminal is used in order to be used in a place to go out.

In the case of a mixed environment of different microprocessors and APIs with different APIs as described above, in order to abstract the differences of environments and provide an environment that can be used together, a virtual machine interpreter (such as a virtual machine) should be used. 500).

The problem that can be solved by using the virtual machine's interpreter is to eliminate the differences in different computer architectures (the abstraction of the execution environment).

On the other hand, the transmission data transmitted and received in the conference system is large data such as moving images, and a large amount of data is also transmitted and received when the conference is to be performed for several hours.

In order to efficiently process such large and large amounts of data, not only an interpreter of a virtual machine is required, but also a structure of a high-speed transmission line and a dynamic dispersion processing capable of dynamically distributing processing load in each apparatus is required.

Fig. 11 is a view showing image display when image display is performed in a distributed manner, wherein (A) is a view showing an image display example when only one liquid crystal projector is used, and (B) is a view showing four liquid crystal projections. The image of the machine is shown in the figure.

When image display is performed by one liquid crystal projector 200, UXGA display, that is, 1600×1200 dots display can be performed by the PC that transmits the conference data to the liquid crystal projector 200, but the liquid crystal projector 200 can only correspond to In the state where the XGA display, that is, the display of 1024×768 dots is reached, according to the presenter's instruction, sometimes the indicator may indicate coordinates that can be displayed on the PC but not displayed on the liquid crystal projector 200 (1500, 920). )

In this case, as shown in FIG. 11(A), it is actually not displayed on the liquid crystal projector 200. Therefore, since the presenter cannot make the pointer operate according to his own operation, there is a case where an effective presentation cannot be performed.

In order to avoid this, as shown in FIG. 11(B), four liquid crystal projectors 200 can be used to project four images 1210-1 to 4 in a shared manner so as to be able to support the display corresponding to the display on the PC. Display area.

Fig. 12 is a view showing a state in which four liquid crystal projectors 200-1 to 4 are used and image display is performed in a distributed manner.

When displaying one image in a shared manner, it is necessary to decide which device to share which region. The use of four liquid crystal projectors to spatially divide an image for display is a typical parallel processing method. At the stage of generating the original presentation file by the application software of the processing device 700, it is convenient in processing if the parallel syntax applicable to such parallel processing is described. In JP-A-6-4498, a method of writing and translating parallel execution units included in a cobegin coend is disclosed, and this method can also be used in this embodiment.

FIG. 13 is a schematic diagram showing a communication method when the virtual machine 500 is used. (A) is a view showing a conventional communication method, and (B) is a view showing a communication method according to the present embodiment.

In order to perform the above-described dynamic dispersion processing, it is necessary to install not only the virtual machine 500 in the projector 200 but also the generation of the application software, that is, the application layer program 12, which must be generated after considering which drawing area is shared by which liquid crystal projector 200. .

In general, in order to perform parallel processing on a certain execution unit of a program, the following two conditions must be met. First, the first condition is that the object program processing system including the OS must have resources that can execute a certain program slice, that is, an execution unit in parallel, and more specifically, must have an independent correspondence with the number of parallel processing. Processing device. The second condition is that the object program itself must be described as having a processing unit that can be executed in parallel and can be judged in the processing system.

Further, in the present embodiment, "decentralized execution" is a broad concept of parallel execution. When a certain processing unit is distributed to another processing system, it is desirable to process in parallel in time and at the time of obtaining the result. A special case that must be synchronized is called "parallel execution."

For example, as shown in FIG. 13(A), when two liquid crystal projectors 200-5 and 6 are connected via the IEEE802.3 bus 192, they should be established between the application layer programs 12-5 and 6. Like the connection on the other side. When the first liquid crystal projector 200-5 that starts interpreting the original presentation data detects that it exceeds its own display range in the statement of the program, it tries to distribute the portion with the liquid crystal projector 200-6. .

At this time, as a specific operation, the control unit of the transmission control program of the built-in OS of the liquid crystal projector 200 is read, and the line connected to the liquid crystal projector 200-6 is opened by the IEEE802.3 bus 192, and the target range of the distributed processing is transmitted. .

The application layer program 12-5 must sequentially perform processing such as network connection, line opening, and processing part of the transmission using the service routine of the built-in OS. The other application layer program 12-6 is required to perform the same network connection, allow line opening, and receive part processing, etc., on the service side.

In order to use a plurality of liquid crystal projectors, it is only required to perform the above-described processes to make the specifications of the application layer programs 12-5 and 6 described as the original presentation files complicated, and it is necessary to rewrite them in accordance with the execution environment each time.

As mentioned above, the application layer program 12 seen here is actually the original presentation data generated by another application layer program for generating presentation material. As shown in the example of FIG. 4, the content of the original presentation data can be interpreted as a set of command words of intermediate language objects executed by virtual machine 500.

For ease of use, it must be designed to cross-describe a variety of parallel syntaxes from the beginning in the application layer program with a certain degree of parallel processing, and can be executed in parallel when the execution environment allows parallel processing. As an alternative, the virtual machine 500 can also communicate with other virtual machines in a dynamic and independent manner during the execution phase and disperse the processing.

As a method of pre-described a plurality of parallel processing syntaxes as the former, a communication method between the intermediate language interpreting programs disclosed by the applicant in Japanese Patent Laid-Open No. Hei 6-4498 can be installed.

In addition, as a way of communicating with other virtual machines in a dynamic and independent manner in the execution phase, for example, a method implemented using a JAVA virtual machine, a multi-node based method, or the like may be employed.

By adopting the above method, even when the number of liquid crystal projectors is increased to 16, 64, etc., it is not necessary to rewrite the original presentation data again.

In the present embodiment, as shown in Fig. 13(B), an IEEE 1394 bus 300 that realizes long-distance access of storage resources between nodes is employed.

In the case where the communication method between the intermediate language interpreting programs disclosed by the applicant in Japanese Patent Laid-Open No. Hei 6-4498 is installed, the main interpreter of the virtual machine 500-1 of a certain liquid crystal projector 200-1 is in the loading phase. Reading the object code

described in the working area of the slave side interpreter as the executed process in the intermediate language into the storage space of the other liquid crystal projector 200-2, and then reading the stack initialization data, and according to the The indication of the data stores the data of the initial state on the stack and sets the stack pointer.

Next, the table initialization data is read, and a series of operations for initial setting the contents of the execution block data management table and the shared resource management table are performed. The above operation can be realized by a higher layer protocol such as communication using an RS232C serial line or the like, or a network file system commonly found in an OS of a UNIX system. However, in order to perform remote memory access at a realistic processing speed, it is necessary to perform installation by IEEE 1394 bus transaction processing.

In this manner, when the application layer programs 12-1, 2 are generated, they can be generated without considering the drawing sharing area or the like, and can be between the virtual machines 500 lower than the application layer programs 12-1, 2 by one level. A virtual connection is established on the image.

Hereinafter, the distributed processing of this embodiment when the JAVA virtual machine is used as the virtual machine 500 will be described in detail.

Fig. 14 is a functional block diagram at the time of performing the dispersion processing of the embodiment.

The liquid crystal projector 200-1 includes a conversion unit 50 to which a virtual machine 500 for converting transmission data transmitted from another liquid crystal projector 200-2 or the like as a data transfer device into a data format that can be generated or reproduced is mounted, and The communication interface unit 30 that receives the transmission data that can be converted by the conversion unit 50 from the input device 400.

Further, the liquid crystal projector 200 further includes a generating unit 10 that generates meeting data based on the transfer data converted by the converting unit 50, and performs the generated meeting data for each of the other liquid crystal projectors 200 for each predetermined unit. The management unit 90 that stores the conference data in the storage unit 40 and reads the conference data for each of the other liquid crystal projectors 200 and the reproduction unit 20 that reproduces the read conference data is managed.

In the storage unit 40, in addition to the conference data including the presentation data and the transmitted transmission data, the management table 42 and the like used by the control unit 90 are stored.

Further, the storage unit 40 can be accessed by the communication interface unit 30 by another liquid crystal projector 200 or the like.

Hereinafter, the virtual machine 500 used in the present embodiment will be described.

FIG. 15 is a functional block diagram of a software unit and a hardware unit in the projector 200.

The software unit includes a generation unit 10 having an API for audio processing (Application Programming Interface) and an image processing API, a scheduler having a plurality of command words, a command word, and a plurality of device drivers. The control unit 90 of the runtime library and the virtual machine 500.

Alternatively, a sound processing stage or an image processing stage may be installed instead of the sound processing API or the image processing API.

The virtual machine 500 used in the present embodiment means a device that reads a common file format and thus can perform the specified operation, and specifically, for example, a JAVA virtual machine or the device disclosed in Japanese Laid-Open Patent Publication No. Hei 6-4498. There are virtual machines such as interpreters that can be processed in parallel.

As the installation method of the JAVA virtual machine, an interpreter method, a compiling method, a dedicated CPU method installed in the hardware unit, and the like installed in the software unit may be employed, but in the present embodiment, it is installed in the software unit.



The virtual machine 500 structurally includes a plurality of threads each having one program counter and one stack, and a heap area. That is, the stack and the heap area are work areas, and also function as the storage unit 40.

In addition, since there are a plurality of stacks, so-called multi-thread processing can be performed. Therefore, the execution performance and the parallel execution performance at the time of the distributed processing can be improved.

Further, the hardware unit includes a reproduction unit 20 equipped with a display unit, a control unit 90 having a video controller, a storage unit 40 having a video RAM (V-RAM) area, and an IEEE1394 link layer and IEEE1394 physics. The layer communication interface unit 30.

Hereinafter, actual display processing using a plurality of liquid crystal projectors 200-1 and 2 will be described.

It is assumed that the liquid crystal projector 200-1 is used as a main projector, and the liquid crystal projector 200-2 is used as a slave projector.

It is assumed that the liquid crystal projector 200-1 draws an image 1210-1, that is, coordinates (0, 0) to coordinates (1024, 768). This drawing information is stored in the storage unit 40.

When the second liquid crystal projector 200-2 is connected to the IEEE1394 bus 300, the liquid crystal projector 200-1 serving as a main projector and the liquid crystal projector 200-2 serving as a slave projector can transmit and receive transmission data.

At this stage, the liquid crystal projector 200-2 can judge that the liquid crystal projector 200-1 has been operated while referring to the drawing information of the storage unit 40-1 of the liquid crystal projector 200-1, thereby confirming that the liquid crystal projector 200-1 shares Drawing area.

After the confirmation, the liquid crystal projector 200-2 reads out the image information to be displayed by itself from the storage unit 40-1 of the liquid crystal projector 200-1, and converts it into a data format that can be processed by the own device by the virtual machine 500. Write to the V-RAM area and display it on the display under the control of the video controller.

As described above, the stack area in the storage section 40 is provided for each thread. Even if the stack area within a certain thread is in use due to multi-thread processing, the stack area of other threads can be used, so even in the case of the shared storage unit 40, the parallel execution is hardly lowered.

Further, since the transmission data can be transmitted and received at a high speed by using the IEEE1394 bus 300 and the IEEE1394 bus interface, even in the case of sharing the storage unit 40, each of the liquid crystal projectors 200 can be almost identical to the storage unit 40 that references itself. The same speed is referred to the storage unit 40 of the other liquid crystal projector 200.

Further, for example, there may be cases where the liquid crystal projectors 200 having different display capabilities are mixed, that is, one liquid crystal projector 200 is a VGA display, that is, 640×480 dots display, and the other liquid crystal projector 200 is an SVGR display. That is, 800 x 600 dots are displayed, and the other liquid crystal projector 200 is an XGR display, that is, a 1024 x 768 dot display.

In the above case, even when it is necessary to display the above-described coordinates (1500, 920), display can be performed by connecting liquid crystal projectors 200 having different display capabilities to each other. For example, if the main liquid crystal projector 200 is a VGR display, if all nine liquid crystal projectors 200 are connected, the display area of 1920 × 1440 dots can be covered, and thus the coordinates (1500, 920) can be displayed.

Even in this case, the slave liquid crystal projector 200 can automatically adjust the display capability by referring to the drawing information in the storage unit 40 of the main liquid crystal projector 200. In this way, since the conference data can be generated by the effective distributed processing, even a large and large amount of conference data can be smoothly generated and reproduced, so that a conference system with fast response can be realized. Further, not only the distributed processing implementation based on the shared memory method but also the above-described distributed processing may be performed in the target transfer manner.

Although the method for realizing the conference system has been described above, the conference system that achieves the above-described effects can also be realized by the computer-readable information storage medium.

(Note on information storage media)

Fig. 16 is a functional block diagram of an information storage medium according to an example of the embodiment. The information storage medium 1400 stores information for realizing the above various functions in the storage information for reading by the computer 1200. The computer 1200 includes a transmission/reception unit 1230 for communicating with another processing device 1100 via the communication line 1300, a storage unit 1240 that stores various data and programs, and the like, and a processing unit 1250 that performs image processing and the like. The reproduction unit 1220 that reproduces data such as the display, and the information reading unit 1290 that reads information from the information storage medium 1400.

As the hardware configuration of each of the above-described units, for example, as the transmission/reception unit 1230, a communication device having an IEEE1394 interface, an ATM switch, or the like can be used as the storage unit 1240. A ROM, a RAM, or the like can be used. As the reproduction unit 1220, a display, a projection device, or the like can be used. As the processing unit 1250, a CPU, an image processing processor, or the like can be used.

Further, as the information storage medium 1400, for example, a hard disk or a memory such as a CD ROM or a DVD ROM that reads information by a laser, and magnetic information can be used.

Further, instead of directly connecting the information storage medium 1400 to the information reading unit 1290, the computer 1200 may download and read the storage information 1410 in the service device via the communication line 1300.

Further, as the communication line 1300 which is a transmission line, for example, an IEEE 1394 bus, an optical fiber, or the like can be used.

Here, for example, when the log function described above is implemented, the storage information 1410 is information that receives transmission data from the plurality of processing devices 1100 via the transmission line, that is, the communication line 1300, and generates conference data reflecting the transmission data, the information including the structure. The presentation information, the storage information for storing the transmission data in each of the processing devices 1100, and the storage information stored in the storage unit 1240 and the reproduction instruction for the conference participant are read from the storage unit 1240. Information for reading the conference data of at least a part of the data and the presentation information.

In this way, the conference participants can immediately replay the past conference data according to the instructions.

Further, it is preferable that the read information includes information for reading the conference data stored in the storage unit 1240 for each processing device 1100 in accordance with the reproduction instruction.

In this way, it is possible to discriminate from which processing device 1100 what kind of transmission data is received.

In addition, the conference data reflecting the transmission data of each processing device 1100 may be reproduced. Specifically, for example, when a plurality of conference participants transmit input data using their respective input devices, playback can be performed for each input device, that is, for each conference participant.

Preferably, the storage information 1410 includes information for capturing a situation of the conference, and the storage information includes information for storing the image data as a part of the conference data in the storage unit 1240 in a predetermined unit, the reading. The usage information includes information for reading the conference data stored in the storage unit 1240 in each predetermined unit in accordance with the above-described reproduction instruction.

In this way, the camera results of the conference situation can be immediately reproduced. Since the image data includes not only the reproduced presentation data but also the motion of the presenter, the conference situation can be appropriately grasped.

Similarly, it is preferable that the storage information 1410 includes recording information for recording a conference situation, and the storage information stores the recorded data as a part of the conference data in the storage device in a predetermined unit.

In this way, since the sounds can be combined and reproduced, it is possible to further appropriately grasp the situation of the meeting.

Here, as the predetermined unit described above, for example, a chapter unit, a unit of a chapter, a page unit, or the like can be used. That is, for example, if the conference participant issues a reproduction instruction in the second section of Chapter 3, the portion can be played back immediately.

Further, the stored information 1410 preferably further includes information for reproducing the read information.

In this manner, the read conference data is reproduced by display, projection, sound reproduction, etc., so that the conference participants can immediately confirm the conference data. Further, the stored information 1410 preferably further includes information for transmitting the read information described above to the processing device 1100.

In this manner, the reproduction, printing, and the like of the conference data can be performed by the processing device 1100 such as a display device, a printing device, or the like.

Further, in order to improve the above-described mutual connectivity, the storage information 1400 can be configured as follows.

For example, the storage information 1410 is configured to include interpretation information for installing the virtual machine 500 and interpreting the received transmission data by the virtual machine 500, and generation information for generating the conference data based on the interpretation result.

In this manner, data exchange between the processing device 1100 and the computer 1200 can be easily performed by using the virtual machine 500 which generalizes the form of the transmitted data and converts it into the transfer data which can be interpreted by the device itself. Thereby, a conference system capable of flexibly replacing various processing devices can be realized.

Further, as another configuration, the storage information 1410 is configured to include information for generating transmission data that can be interpreted by the virtual machine 500 and information for transmitting the generated transmission data.

In this manner, by generalizing the form of the transmitted data and generating and transmitting the transfer data which can be interpreted by the virtual machine 500 in the other processing device 1100, the processing device receiving the transferred data does not need to consider the transfer device of the transfer data. The type or manufacturer can handle the transfer of data. Therefore, data exchange between the processing apparatuses 1100 can be facilitated. Thereby, a conference system capable of flexibly replacing various processing apparatuses 1100 can be realized.

Further, as another configuration, the storage information 1410 is configured to include presentation information for transmitting a state in which the above-described explanation has been performed on the input data including the processing device transmitted from the plurality of input devices. The data is stored in the storage device while the data is managed by each of the input devices, and the conference data for reproducing at least a part of the input data and the presentation information from the storage device based on the playback instruction. Information for recycling.

In this way, the conference participants can play back according to the conference data indicating the past.

Further, preferably, the storage information includes storage data for storing the transfer data including the input data in the state in which the above-described explanation has been performed, and storing the data in the

storage unit 1240. The information, the reproduction information, includes reproduction information for reproducing, from the storage device, at least a part of the conference data including the transmission data and the presentation information, in accordance with the reproduction instruction.

In this manner, the conference participants can perform playback for each processing device 1100 by issuing an instruction to reproduce past conference data for each processing device.

Specifically, for example, when a plurality of conference participants transmit input data using their respective input devices, playback can be performed for each input device, that is, for each conference participant.

Further, preferably, the storage information 1410 includes information for capturing a situation of the conference, and the storage information includes information for storing the transmission data including the imaging result in the storage unit 1410 in a predetermined unit, and the reproduction is performed. The information includes transmission data for reproducing the image pickup result stored in the storage unit 1410 in accordance with each of the predetermined units in accordance with the reproduction instruction.

In this way, the camera results of the conference situation can be immediately reproduced. Since the image data includes not only the reproduced presentation data but also additional information such as an image indicated by the presenter, the conference situation can be appropriately grasped.

Here, as the predetermined unit described above, for example, a chapter unit, a unit, a page unit, or the like can be used. That is, for example, if the conference participant issues a reproduction instruction in the second section of Chapter 3, the portion can be played back immediately.

Further, the transmission data preferably includes at least one of image data, an image generation object, an image generation control object, an image display object, and an image display control object.

In this way, a conference system capable of efficiently exchanging various data used in a conference can be realized.

Further, the above transmission line preferably includes an IEEE1394 bus in its structure.

In this way, it is possible to exchange transmission data and the like at high speed between the respective processing devices. In particular, although the amount of data transmitted by image data or the like is large, real-time processing can be easily performed by using the IEEE 1394 bus.

The above is the configuration of the storage information 1410 for improving the mutual connectivity. Hereinafter, the configuration of the storage information 1410 for improving the data processing efficiency of the distributed processing will be described.

For example, the storage information 1410 is configured to generate conference data while transmitting and receiving the general-purpose transmission data interpretable by the virtual machine 500 between the plurality of processing devices 1100 connected via the transmission line, that is, the communication line 1300, and performing distributed processing. The information includes information for installing the communication interface unit 30 for sharing the storage unit 1240 with the other processing device 1100.

In this manner, the storage unit 1240 accessible by each processing device 1100 can be provided. Since this storage method is realized, it is particularly effective in the dispersion processing.

Here, the transmission line is preferably an IEEE 1394 bus, and the communication interface unit is preferably an IEEE 1394 bus interface.

In this manner, each processing device 1100 can be made to access the shared storage unit 1240 at a high speed as if it were a storage area of the own device.

Further, as another configuration, the storage information 1410 is configured to transmit and receive the general-purpose transmission data interpretable by the virtual machine 500 between the plurality of processing devices 1100 connected through the transmission line, that is, the communication line 1300, and perform The distributed processing generates information of the conference data, the information including structure information for generating the general-purpose transmission data, and for transmitting to at least one processing device 1100

having a storage unit accessible by each processing device 1100. The generated information of the above transmitted data.

In this manner, by generating the general-purpose transmission data and storing it in the shared storage device, each processing device can access the storage portion and acquire the transmission data, which is particularly effective in the distributed processing.

For example, when the JAVA applet is used as the transfer data, the plurality of processing devices can simultaneously download the JAVA applet stored in the storage device, and the specification change, function expansion, and the like can be easily performed.

Here, the above transmission line is preferably an IEEE 1393 bus.

In this manner, each processing device can be made to access the shared storage area at a high speed as if accessing the storage area of the own device.

Further, as another configuration, it is preferable that the storage information 1410 is configured to transmit and receive a general-purpose transmission data interpretable by the virtual machine 500 between a plurality of processing apparatuses 1100 connected by a transmission line and perform distributed processing. The information of the conference data is reproduced and configured to include the conference stored in the storage unit by at least one of the processing devices 1100 having a storage unit that can access the conference data by the processing device 1100 and store the conference data. Information for reading data and information for reproducing reproduction of the read image data.

Further, the read information includes, in structure, information for generating transfer data indicating a read request and converting the transfer data into the general-purpose transfer data, and for processing the device 1100 having the storage unit. Transmitting the converted transmission data and receiving information of the transmission data including the conference data from the processing device 1100, the reproduction information including the information for installing the virtual machine 500 and the transmission data according to the reception. The virtual machine 500 converts information for transmitting data and reproducing the conference data.

In this manner, by using the transfer data in a general form, it is possible to adapt to the difference of the OS or the manufacturer and to receive and display the image data without considering the device category on the image supply side.

Further, as another configuration, it is preferable that the storage information 1410 is configured to transmit and receive a general-purpose transmission data interpretable by the virtual machine 500 between a plurality of processing apparatuses 1100 connected by a transmission line and perform distributed processing. The information of the conference data is generated and includes request information for requesting a predetermined service from the other processing device 1100, and provision information for providing a predetermined service to the other processing device 1100.

The request information includes information for generating transmission data indicating the predetermined service request and converting the transmission data into the general-purpose transmission data, and information for transmitting the converted transmission data to another processing device. The above-mentioned providing information includes information for installing the virtual machine 500, information for receiving transmission data indicating a service request from another processing device, and converting the data by the virtual machine 500, and determining whether the information can be provided based on the converted transmission data. Information about the service and information that is used to provide the service when it is available.

In this manner, each processing device can perform image processing in a shared manner while exchanging information with each other. For example, if a print service is requested by a projector, a printer that can provide a print service prints in response to the request.

This decentralization processing can also be realized by simplifying data exchange between the respective processing apparatuses 1100 by employing the virtual machine 500 and making the transmission data into a general form.



Further, it is preferable that the transmission data includes at least one of conference data, a conference data generation target, a conference data generation control target, a conference data reproduction target, and a conference data reproduction control target.

In this way, since these data or objects have been unified into a general form, the versatility of various image processing in the distributed processing can be improved.

Further, the above transmission line preferably includes an IEEE1304 bus in structure.

In this manner, each processing device 1100 can be made to access the shared storage device at a high speed as if accessing the storage area of the own device. Further, each processing device can perform the above-described information exchange at a high speed, so that the processing speed can be improved.

(Modification)

The application of the present invention is not limited to the above embodiments, and can be applied to various modifications.

For example, an embodiment in which the IEEE1394 bus 300 is employed has been described as the above transmission line, but various forms can be adopted as long as it is a high-speed transmission line. Specifically, for example, a light channel or a satellite communication line or the like can be employed.

Further, in the above embodiment, the dispersion processing using two conference data reproducing apparatuses (liquid crystal projector 200) has been described, but two conference data generating apparatuses, one conference data generating apparatus, and one conference data reproducing apparatus are employed. Dispersion treatment is also included in the scope of application of the present invention.

Further, the data used for the presentation is mainly the addition of secondary information such as the collected sound, the character code obtained as a result of the voice recognition, and the character code obtained by handwritten character recognition on a digitizing device such as a tablet. For these recognition processes, high-speed processing can be realized by using a DSP (Digital Signal Processor) which is superior in the arithmetic function of the information processing system. As is apparent from the above embodiments, the distributed processing of the present invention is dispersed based on communication between virtual machine interfaces and independent processing.

If it is in the existing mode, in order to use the DSP, the application software (application layer program) must be generated by the special machine language inherent to the DSP and transmitted and executed by the DSP system. However, according to the present invention, a virtual machine interpreter can be installed on a DSP system connected through an IEEE 1394 bus, and applied to process dispersion. As a result, the DSP's superior computing power resources can be used without having to rewrite the original presentation file as an application layer program.

Further, as described above, the programming language for implementing the present invention is not limited to JAVA. There are a variety of languages that can generate virtual machines and can support multiplexing of processor resources at the machine language level described above. In this language, the same description as the description of the above-described drawing command in the present invention can be performed. The present invention can be implemented in a variety of languages that do not rely on high level language-level syntax lexical analysis specifications to achieve the degree of drawing command words. Industrial applicability

The present invention can be applied to a conference system in which a presenter applies a presentation to a listener using a personal computer and a projector.

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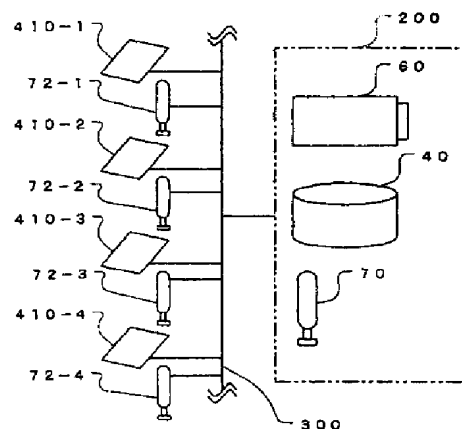
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[54] 发明名称 会议系统及信息存储媒体

[57] 摘要

一种会议系统,包含通过传输线路从多个数据传送装置接收传送数据并生成反映该传送数据的会议数据的会议数据生成装置。进一步,上述会议数据生成装置,包含用于一边按上述每个数据传送装置管理接收到的传送数据一边将其存储在存有规定的演示用数据的上述存储装置内并根据上述每个数据传送装置的再生指示从上述存储装置读出包含着上述传送数据及上述演示用数据的至少一部分的会议数据的数据控制装置。



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## 权 利 要 求 书

1. 一种会议系统，包含通过传输线路从多个数据传送装置接收  
传送数据并生成反映该传送数据的会议数据的会议数据生成装置，该  
会议系统的特征在于：上述会议数据生成装置，包含用于一边按上述  
5 每个数据传送装置管理接收到的传送数据一边将其存储在存有规定的  
演示用数据的上述存储装置内并根据上述每个数据传送装置的再生  
指示从上述存储装置读出包含着上述传送数据及上述演示用数据的  
至少一部分的会议数据的数据控制装置。

2. 根据权利要求 1 所述的会议系统，其特征不在于：上述数据控制  
10 装置，一边按每个规定的单位管理接收到的传送数据一边进行存储，  
并根据上述再生指示按每个规定的单位读出上述会议数据。

3. 根据权利要求 2 所述的会议系统，其特征不在于：上述会议数据  
生成装置，包含用于对会议情况进行摄像的摄像装置，上述数据控制  
装置，将摄像数据作为上述会议数据的一部分按上述每个规定的单位  
15 存储在上述存储装置内，上述数据控制装置，根据上述再生指示按上  
述每个规定的单位读出存储在上述存储装置内的上述会议数据。

4. 根据权利要求 1~3 中的任何一项所述的会议系统，其特征在  
于：上述会议数据生成装置，包含用于对上述读出的会议数据进行再  
生的再生装置。

5. 根据权利要求 1~4 中的任何一项所述的会议系统，其特征在  
20 于：上述会议数据生成装置，包含用于向其他处理装置传输上述读出  
的会议数据的传输装置。

6. 根据权利要求 1~5 中的任何一项所述的会议系统，其特征在  
于：上述数据传送装置，包含多个输入装置，上述数据控制装置，一  
25 边按每个上述输入装置管理从上述输入装置传送的上述传送数据一  
边将其存储在上述存储装置内，并根据上述再生指示从上述存储装置  
读出会议数据。

7. 根据权利要求 1~6 中的任何一项所述的会议系统，其特征在  
于：上述会议数据生成装置，包含投影机。

8. 一种信息存储媒体，存储用于通过传输线路从多个数据传送装  
30 置接收传送数据并生成反映该传送数据的会议数据的信息并可由计  
算机读取，该信息存储媒体的特征在于：上述信息，包含演示用信息、



用于一边按上述每个数据传送装置管理上述传送数据一边将其存储在存储装置内的存储用信息、及用于根据再生指示从上述存储装置读出包含着上述传送数据及上述演示用信息的至少一部分的会议数据的读出用信息。

5 9. 根据权利要求8所述的信息存储媒体, 其特征在于: 上述读出用信息, 包含用于根据再生指示按上述每个数据传送装置读出存储在上述存储装置内的上述会议数据的信息。

10 10. 根据权利要求8、9的任何一项所述的信息存储媒体, 其特征在于: 上述信息, 包含用于对会议情况进行摄像的信息, 上述存储用信息, 包含用于按规定单位将摄像数据作为上述会议数据的一部分存储在上述存储装置内的信息, 上述读出用信息, 包含用于根据上述再生指示按上述每个规定单位读出存储在上述存储装置内的上述会议数据的信息。

15 11. 根据权利要求8~10中的任何一项所述的信息存储媒体, 其特征在于: 上述信息, 包含用于对上述读出的信息进行再生的信息。

12. 根据权利要求8~11中的任何一项所述的信息存储媒体, 其特征在于: 上述信息, 包含用于将上述读出的信息向其他处理装置传输的信息。

## 说明书

### 会议系统及信息存储媒体

#### 技术领域

5 本发明涉及会议系统及会议用信息存储媒体。

#### 背景技术

在现有的会议系统中，当进行演示时，由演示者在某个会场上利用个人计算机和投影机对听众进行演示。

10 但是，实际上，在某些情况下，需要的不仅是这种单向演示，而是允许多人对演示屏面进行写入或当对屏面进行了写入时再次重放的、在演示者与演示接收者之间的双向通信方式。

作为这种重放的方法，虽然也可以考虑用录像设备进行摄影并再生的方法，但是为了将会议中的一个场面或演示中的第几章之类的一个部分进行再生就必须进行倒放或快放，因而缺乏快速性。

15 另外，如果只是演示数据、即预先利用应用软件生成的数据，则上述的一部分的再生还比较容易，但对进行演示时的情景、例如指示棒的动作等进行再生实际上是不可能的。

#### 发明的公开

20 本发明是鉴于上述课题而开发的，其目的是提供一种可以根据指示立即对过去的会议情况进行再生的会议系统及信息存储媒体。

为解决上述课题，本发明的会议系统，包含通过传输线路从多个数据传送装置接收传送数据并生成反映该传送数据的会议数据的会议数据生成装置，该会议系统的特征在于：上述会议数据生成装置，包含用于一边按上述每个数据传送装置管理接收到的传送数据一边  
25 将其存储在存有规定的演示用数据的上述存储装置内并根据上述每个数据传送装置的再生指示从上述存储装置读出包含着上述传送数据及上述演示用数据的至少一部分的会议数据的数据控制装置。

按照这种方式，会议参加者等，可以根据指示立即重放过去的会议数据。

30 另外，通过一边按每个数据传送装置进行管理一边存储，可以判别出从哪个数据传送装置接收到什么样的传送数据。

进一步，还可以对反映出每个数据传送装置的传送数据的会议数

据进行再生。具体地说，例如，当多个会议参加者用其各自的输入装置传送输入数据时，可以按各个输入装置、即按每个会议参加者进行重放。

此外，这里，作为上述再生指示，具体地说，例如可以是由会议参加者或演示者用规定的再生指示装置发出的再生指示等。

另外，上述数据控制装置，最好是一边按每个规定的单位管理接收到的传送数据一边进行存储，并根据上述再生指示按每个规定的单位读出上述会议数据。

这里，作为规定的单位，例如可以采用章单位、节单位、页单位等。即，例如，如果会议参加者发出第3章的第2节部分的再生指示，则可以立即对该部分进行重放。

另外，最好是，上述会议数据生成装置，包含用于对会议情况进行摄像的摄像装置，上述数据控制装置，将摄像数据作为上述会议数据的一部分按上述每个规定的单位存储在上述存储装置内，上述数据控制装置，根据上述再生指示按上述每个规定的单位读出存储在上述存储装置内的上述会议数据。

这里，作为会议情况，例如可以是讲述者（演示者）或会议参加者用指示棒、激光指示器或手指在屏幕前或图形输入板上指示的图象及反映这些指示的图象等。

即，由于在摄像对象中不仅包含所再生的演示数据而且还包含反映了会议参加者的指示的图象等，所以可以根据摄像结果立即对指示位置及指示内容进行再生，并能适当地掌握会议中讲述者与会议参加者相互间进行讨论的会议情况。

同样，最好是包含用于对会议情况进行录音的录音装置，上述数据控制装置，将录音数据作为上述会议数据的一部分按每个规定的单位存储在上述存储装置内。

这里，作为会议情况，例如可以是讲述者或会议参加者的发言或谈话等。按照这种方式，由于还可以将声音合在一起进行再生，所以能够进一步适当地掌握会议情况。

上述会议数据生成装置，最好是包含用于对上述读出的会议数据进行再生的再生装置。

按照这种方式，可以通过显示、投影、声音再生等对所读出的会

议数据进行再生，因而使会议参加者能够立即确认会议数据。

上述会议数据生成装置，最好是包含用于向其他处理装置传输上述读出的会议数据的传输装置。

5 按照这种方式，可以用例如显示装置、打印装置等其他处理装置执行对会议数据的再生、打印等。

上述数据传送装置，最好是包含多个输入装置，上述数据控制装置，最好是一边按上述每个输入装置管理从上述输入装置传送的上述传送数据一边将其存储在上述存储装置内，并根据上述再生指示从上述存储装置读出会议数据。

10 按照这种方式，可以按各个输入装置、即按每个会议参加者进行重放。具体地说，例如，可以对反映了会议参加者用鼠标或笔式图形输入板等输入的数据的会议数据进行再生，并能立即确认出是谁进行了什么样的操作。

这里，上述会议数据生成装置，最好是包含投影机。

15 按照这种方式，通过采用投影机，可以实现即使是大型会议也能适应的会议系统。

20 另外，本发明的信息存储媒体，存储用于通过传输线路从多个数据传送装置接收传送数据并生成反映该传送数据的会议数据的信息并可由计算机读取，上述信息，最好是包含演示用信息、用于一边按上述每个数据传送装置管理上述传送数据一边将其存储在存储装置内的存储用信息、及用于根据再生指示从上述存储装置读出包含着上述传送数据及上述演示用信息的至少一部分的会议数据的读出用信息。

25 按照本发明，会议参加者，可以根据指示立即重放过去的会议数据。

另外，上述读出用信息，最好是包含用于根据再生指示按上述每个数据传送装置读出存储在上述存储装置内的上述会议数据的信息。

30 按照这种方式，可以判别出从哪个数据传送装置接收到什么样的传送数据。

另外，也可以对反映每个数据传送装置的传送数据的会议数据进行再生。具体地说，例如，当多个会议参加者使用其各自的输入装置

传送输入数据时，可以按各个输入装置、即每个会议参加者进行重放。

另外，最好是，上述信息，包含用于对会议情况进行摄像的信息，上述存储用信息，包含用于按规定单位将摄像数据作为上述会议数据的一部分存储在上述存储装置内的信息，上述读出用信息，包含用于根据上述再生指示按上述每个规定单位读出存储在上述存储装置内的上述会议数据的信息。

这里，作为会议情况，例如可以是讲述者（演示者）或会议参加者用指示棒、激光指示器或手指在屏幕前或图形输入板上指示的图象及反映这些指示的图象等。

即，由于在摄像对象中不仅包含所再生的演示数据而且还包含反映了会议参加者的指示的图象等，所以可以根据摄像结果立即对指示位置及指示内容进行再生，并能适当地掌握会议中讲述者与会议参加者相互间进行讨论的会议情况。

同样，最好是包含用于对会议情况进行录音的录音用信息，上述存储用信息，最好是包含用于将录音数据作为上述会议数据的一部分按每个规定的单位存储在上述存储装置内的信息。

这里，作为会议情况，例如可以是讲述者或会议参加者的发言或谈话等。按照这种方式，由于还可以将声音合在一起进行再生，所以能够进一步适当地掌握会议情况。

另外，这里，作为上述规定的单位，例如可以采用章单位、节单位、页单位等。即，例如，如果会议参加者发出第3章的第2节部分的再生指示，则可以立即对该部分进行重放。

上述信息，最好是包含用于对上述读出的信息进行再生的信息。

按照这种方式，可以通过显示、投影、声音再生等对所读出的会议数据进行再生，因而使会议参加者能够立即确认会议数据。

上述信息，最好是包含用于将上述读出的信息向其他处理装置传输的信息。

按照这种方式，可以用例如显示装置、打印装置等其他处理装置执行对会议数据的再生、打印等。

附图的简单说明

图1是本实施形态一例的会议系统的简图。

图 2 是本实施形态一例的会议情况的说明图。

图 3 是本实施形态一例的会议系统的结构图。

图 4 是表示本实施形态的会议数据及管理表的数据结构一例的简图。

5 图 5 是表示本实施形态一例的会议系统中的处理流程的流程图。

图 6 是本实施形态的另一例的会议系统的功能框图。

图 7 是本实施形态的另一例的会议系统的功能框图。

图 8 是采用了控制装置的会议系统的简图。

10 图 9 是表示采用了控制装置的会议系统中的处理流程的流程图。

图 10 是表示管理表的一例的图。

图 11 是表示以分散方式进行图象显示时的图象显示的图，(A)是表示只采用 1 台液晶投影机时的图象显示例的图，(B)是表示采用 4 台液晶投影机时的图象显示例的图。

15 图 12 是采用 4 台液晶投影机并以分散方式进行图象显示时的示意图。

图 13 是表示采用了虚拟机时的通信方式的示意图，(A)是表示现有通信方式的图，(B)是表示本实施形态的通信方式的图。

20 图 14 是进行本实施形态的分散处理时的功能框图。

图 15 是投影机中的软件部和硬件部的功能框图。

图 16 是本实施形态一例的信息存储媒体的功能框图。

用于实施发明的最佳形态

[发明的实施形态]

25 以下，参照附图说明本实施形态的会议系统的最佳实施例。

作为本实施形态的会议系统，例如有由具有双向连接性的通信线路或系统总线连接多个显示装置和输入装置的会议系统等。更具体地说，例如有在某个会议参加者指示显示装置的投影或显示画面的同时另一个会议参加者用输入装置对屏面上所显示的图象附加信息的会议系统、存在着多个分别配置在相隔很远的地区的即使作为单个系统也可以使用的会议系统并通过通信路径使各会议系统之间同步连接从而为使相隔很远的地区的参加者能够参加同一会议提供支持的会



议系统等。

（关于会议系统结构的说明）

图 1 是本实施形态一例的会议系统的简图。

如图 1 所示，会议系统，在结构上包含输入装置 400、输出装置  
5 600、既具有作为生成会议数据的会议数据生成装置的功能又具有作  
为再生会议数据的会议数据再生装置的功能的会议数据处理装置 2、  
及处理装置 700，这些装置，通过作为高速传输线路的 IEEE1934 总  
线 300 相互连接。

会议数据处理装置 2，除了从输入装置 400 接收传送数据、根据  
10 该传送数据生成会议数据并向输出装置 600 发送所生成的会议数据  
以外，还与处理装置 700 进行传送数据的发送接收。

具体地说，作为输入装置 400，例如可以是图形输入板、鼠标、  
键盘、扫描器、数字摄像机、携带式信息终端、携带式电话、指示棒  
等。而作为由输入装置 400 向会议数据处理装置 2 传送的信息（传送  
15 数据），例如可以是由图形输入板数字化后的坐标信息、将指示器在  
图形输入板上的移动轨迹数字化后的信息、将鼠标装置的轨迹坐标化  
后的信息、通过键盘输入的文字信息、所采集的像素信息、数字化后  
的声音信息等。此外，作为输出装置 600，例如可以是显示器、携带  
式信息终端、打印机等。

20 另外，作为会议数据处理装置 2，例如可以是液晶投影机等，作  
为处理装置 700，例如可以是 PC（个人计算机）、WS（工作站）、NC  
（网络计算机）、服务装置、主机装置等。

即，这些装置构成由多个会议参加者在 1 个会场使用并通过使这  
些装置相互关联而进行会议数据的生成和再生的一个会议系统。

25 另外，作为 PC 等计算机的处理装置 700，不是会议系统所必需  
的结构，作为处理装置 700 的构成要素，有处理器、ROM、RAM、二次  
存储装置等，但这些要素也都可以看作是会议数据生成装置构成要素  
的一部分。考虑到装置总体的可携带性及可再用性，将处理装置 700  
装在另一壳体内，因此处理装置 700 是以分离的形式记述的。

30 会议系统，不仅适用于围绕一个桌子进行会议的小型会议，而且  
也适用于像多国间的会议那样的将相隔很远的地区的多个装置相互  
连接的会议。

首先说明以 1 台液晶投影机为中心的小型会议中的实施形态，然后说明多个装置相关联的相隔很远地区之间的会议中的实施形态。

(会议情况的说明)

图 2 是本实施形态一例的会议情况的说明图。

5 其中，由作为会议数据处理装置 2 的液晶投影机 200 将图 1 所示的会议数据 44 投射到屏幕 1020 上，演示者 1000 用指示棒 1010 进行演示。

10 另一方面，会议参加者 1002，利用作为输入装置 400 的图形输入板 410 输入数据。所输入的数据，通过 IEEE1394 总线 300 传送到液晶投影机 200 的通信用接口部 30，液晶投影机 200，根据传送到的数据投射构成会议数据 44 的一部分的指示数据 1012。

15 这里，所谓指示数据 1012，例如可以是在所投射的图象的一部分上写入文字的文字数据、在所投射的图象的一部分上写入图形的图形数据、对所投射的图象中的文字加下划线的下划线数据、用圆圈围出所投射的图象的一部分的圆圈数据等。

会议参加者 1002，除了演示数据外，还可以看到用图形输入板 410 输入的指示数据 1012。

20 在实际的会议情况下，即使在会议进行中有时也希望再一次看到特别指定的演示数据中的第几章的第几节并且还包括演示者 1000 的动作，或有时想要确认会议参加者 1002 指出的部位等。

在这种情况下，如果是用 PC 的应用程序生成的演示数据、且只是演示数据则可以指定并再生第几章的第几节。但是，这种方法不能对会议参加者 1002 用图形输入板 410 附加的信息及附加时刻进行再生。

25 另外，虽然可以用录像设备等对会议整体进行摄影和再生，但考虑到为指定第几章的第几节并将其再生而必须进行快放或倒放所必需花费的时间，当有多个会议参加者时，就不可能仅仅再生出特定的会议参加者 1002 指示的部位。

如果能够实现上述设想，就可以用多种方式有效地进行会议。

30 为实现上述设想，本实施形态的液晶投影机 200，如图 1 所示，利用对讲述者等指示的图象等进行摄像的摄像部 60、对会议中的谈话等进行录音并将其数字化的录音部 70、输入装置 400 等对作为 PC



的处理装置 700 生成的演示数据附加信息,并且一边将该信息与分配给各装置的地址相结合并用管理表 42 进行管理,一边将其作为会议数据 44 存储在存储部 40 内。

以下,对本实施形态的会议系统进行更为具体的说明。

5 图 3 是本实施形态一例的会议系统的结构图。

如图 3 所示,在由 4 个人的会议参加者 1002 分别操作图形输入板 410—1~4 进行数据输入时,按每个图形输入板 410 将输入数据存在存储部 40 内。

10 同样,作为讲述者的演示者 1000 的发言,由录音部 70 录音,会议参加者 1002 的谈话或发言,由按每个会议参加者 1002 设置的用作录音装置的声音数字化装置 72 采集,并作为声音记录数据按演示者 1000 及每个会议参加者 1002 存储在存储部 40 内。

对录音部 70、声音数字化装置 72—1~4、图形输入板 410—1~4 分配不重复的设备地址。

15 另外,声音信息的一部分,根据预先登录的规定关键字进行声音识别。对声音识别结果进行字符代码变换并记录为对会议数据的附加信息,或解释为装置控制命令。在后者的情况下,将预先登录的「快放」、「倒放」等术语翻译为进行液晶投影机 200 的动作控制的控制命令,并输入到图 1 所示的控制部 90。

20 另外,由图 1 所示的生成部 10 生成并存储在存储部 40 内的会议数据 44,由图 1 所示的再生部 20 按每个演示者 1000 及每个会议参加者 1002 进行再生。

以下,详细说明会议数据。

(会议数据的说明)

25 图 4 是表示本实施形态的会议数据 44 及管理表 42 的数据结构的一例的简图。

会议数据 44,是从[会议数据开始]标记到[会议数据结束]标记包含着多个数据字段的电子文件。

30 另外,会议数据 44,包含预先准备好的固定的演示数据 1420 及随着会议情况而变化的可变的附加数据 1440。演示数据 1420,通常由 PC 的 OS 的文件系统管理,并保持在作为二次存储装置的存储部 40 内。

另一方面，附加数据 1440，由借助于液晶投影机 200 的内置 OS 的功能而动作的控制部 90 管理，并存储在存储部 40 内。

进一步，会议数据 44，按会议的每个规定单位根据标号进行识别。

5 这里，作为规定单位，例如可以是章单位、节单位、所显示单页的页单位等。例如，当采用章单位、节单位这样的单位时，可以指示出第几章的第几节，因而在演示中可以进行特别有效的指示。

10 如图 4 所示，本实施形态的演示数据 1420，以第 1 章、第 1 节、1 页之类的各种单位附加标号。此外，对演示数据 1420 的[图象]标记等，还设有指示附加数据的图象数据的地址的指针，其结果是，可以使会议数据 42 的整体都能通过指定第几章、第几节、第几页读出其数据。在图中，除符号的箭头外，箭头还指示出指针的所在位置及其指示的部位的一例。

15 另外，例如，当采用页单位这样的单位时，与打印资料的散发单位一一对应。在使用 PC 的演示中，可以对一个单页的部分附加动图象或声音记录数据，但这时仍始终存在着形成一页的帧，因而可以解释为在形成该帧的数据的一部分中包含着包括动作的部分。

20 在 PC 打印领域中的一种众所周知的技术中，采用着可以记述文档体裁及打印信息的语言（页记述语言），其中广泛普及的一种是 Adobe 公司的 PostScript 语言。假如会议数据 44 的记述采用 PostScript 语言，则很容易理解。即，可以采用利用程序语言以页为单位记述图象信息、文字信息等的方法。

25 在该程序语言中，可以根据像素的集合进行包含着像素的记述。在会议数据 44 的记述语言中，这种概念进一步延伸为，通过程序记述，可以将再生所采集的声音的部分及再生动图象的部分都包含在内。作为一种通用程序语言的利用解释程序进行处理的众所周知的例子，有 BASIC 语言，虽然 BASIC 语言在不包含以页为单位记述图象等概念方面与 PostScript 语言的规格不同，但适用于声音数据的再生、动图象的再生等。

30 在本实施形态中，只不过是在实施例列举了 JAVA 语言作为具有双方的少许特征的解釋程序语言。在 JAVA 语言的情况下，例如，具有 AWT (Abstracted Window Tools; 抽象的窗口工具) 及 Swinng

等不受处理系统限制的抽象化绘图用分类定义。而 JAVA 是美国 SunMicrosystems 公司的商标。

应用软件，利用分类功能实现用于进行所需处理的功能。

5 例如，当想要使用绘图类别内的直线产生功能时，请求执行直线产生功能的命令字，产生发往上述类别的报文。在执行包含该命令字的程序片时，例如，如果安装着 JAVA 虚拟机作为图 1 所示的变换部 50 内的虚拟机 500，则可以在任何处理系统上绘制直线像素。同样，如果备有每单位时间进行多次绘制的图象生成程序，则可以再现动图象。

10 另外，声音数据，也同样用 JAVA 语言记述声音采集数据的处理。

这些程序，在人们能够读懂的被称作所谓高级语言的以字符代码记述的源代码级进行开发和存储。而会议数据 44 的记述，不限于 JAVA 语言。例如，也可以采用本申请人的特开平 6—4498 中的基于 PASCAL 语言的语言等各种高级语言。

15 另外，如特开平 6—4498 的图 1 所公开的，用上述高级语言记述的程序，由编译器变换为可由中间语言解释程序解释和执行的中间语言对象。在本实施形态中，将按上述程序产生的中间语言对象用作会议数据 44。

20 在图 4 中，从[页开始]标记到[页结束]标记，是与一个单页相关的单位。在该 1 个处理单位中，存储[图象]标记、[声音]标记。[图象]标记为一连串的可变长字段的标号。在可变长字段中，如上所述，根据从高级语言记述编译后的结果而生成的中间语言记述存储绘图命令。此外，表现为像素集合的静止图象数据，也通过与像素转移绘图命令结合而存储于可变长字段。

25 对于[声音]标记，也同样将数据存储于可变长字段。

另外，图 4 的演示数据 1420 及附加数据 1440，可以与一般计算机上的电子文件一样进行重写。

30 附加数据 1440 的重写部分，存储在从[附加数据开始]标记到[附加数据结束]标记所围出的可变长数据部分。在该可变长数据部分中，存储由图形输入板等附加的图象数据及由送话器等附加的声音数据。

图象数据，存储在[图象数据开始]标记到[图象数据结束]标记之

间，声音数据存储在[声音数据开始]标记到[声音数据结束]标记之间。

另外，在本实施例中，将对原始演示数据（演示数据 1420）附加在会议过程中附加的各种附加数据 1440 后的数据称作会议数据 44，以区别于原始演示数据。两种数据都是可用计算机处理的电子文件。

具体地说，输入到声音数字化装置 72 的声音数据，由声音数字化装置 72 内部装有的送话放大部放大到可识别的电平后，由声音数字化装置 72 内部装有的采样处理部采集为数字信号。该数据由控制部 90 根据应用软件作为会议数据 44 的一部分即附加数据 1440 存储在存储部 40 内。

在存储部 40 内，除了演示数据 1420 及传送到的附加数据 1440 以外，还存储着由控制部 90 使用的用于数据管理的管理表 42。

管理表 42，是用于识别和管理输入装置 400 等装置的表，其中包含用于识别装置的 ID、装置名、用于识别该装置的使用者的数据。

例如，演示者 1000 用指示棒 1010 操作的结果，作为附加数据 1440 的一部分存储在存储部 40 内。由于这种图象数据以与装置 ID 相结合的形式存储，所以例如当再现演示者 1000 的动作时，可以从管理表 42 进行检索而再现存储在附加数据 1440 内的该图象数据。

另外，通过将时刻数据作为附加数据 1440 附加于图象数据，也可以通过指定时刻而再现会议数据 44。

这样，按照本实施形态，可以根据第几章之类的指定立即再现会议情况，同时还可以根据演示者 1000 或会议参加者 1002 的个别指定或时刻指定有选择地再现会议情况。

以下，说明输入装置 400 的任务。作为输入装置 400 之一的图形输入板 410，在结构上包含数字化单元、坐标检测处理部、I/O 控制器、IEEE1394 总线级驱动器。

图形输入板 410 的 I/O 控制器，具有 SBP-2 协议的目标侧节点能力。另一方面，液晶投影机 200 的 I/O 控制器，控制具有 SBP-2 协议的启动端侧节点能力的 SBP-2 驱动器。

作为液晶投影机 200 的本机存储器的存储部 40，通过 SBP-2 驱动器，作为共享存储器向 IEEE1394 总线 300 开放。

由图形输入板 410 侧的 IEEE1394 总线级驱动器在与液晶投影机侧的 IEEE1394 总线级驱动器之间进行由 IEEE1394—1995 规定的总线级事务处理。通过该事务处理，图形输入板 410 通过 IEEE 总线级驱动器对 SBP—2 驱动器进行登录，并获得对上述共享存储空间的访问许可。

在获准登录的情况下，在图形输入板 410 通过 IEEE1394 总线级驱动器进行注销处理之前，可以由图形输入板 410 访问液晶投影机侧的作为共享存储空间的存储部 40。

在由数字化单元对会议参加者 1002 在图象输入板 410 上的指示动作进行了位置检测之后，由坐标检测处理部进行相对位置换算，从而变换为指示坐标及一连串的轨迹数据。通过上述的 SBP—2 协议的动作，将该指示坐标数据及轨迹数据存储于液晶投影机 200 提供的共享存储空间内。

共享存储空间，当从液晶投影机 200 观察时，是为本机存储空间。因此，液晶投影机 200，可以根据需要通过内置 OS 的核心程序将该共享空间分配或复制到由虚拟机 500 的进程或线程管理的存储空间。如从另一观点考虑，则可以由液晶投影机 200 的虚拟机 500 的进程或线程随时监视（监控）使用者在图形输入板 410 上的指示动作的轨迹。

以下，说明实际会议系统中的会议数据生成处理。

（关于会议系统中的处理程序的说明）

图 5 是表示本实施形态一例的会议系统中的处理流程的流程图。

当会议开始时，开始会议数据生成处理，会议数据生成处理进行到会议结束为止。

首先，会议开始后，如会议没有结束（步骤 2），则由控制部 90 将会议数据 44 存储在存储部 40 内（步骤 4）。

在将由 PC 等生成的演示数据存储于存储部 40 内时（步骤 6），由再生部 20 对由控制部 90 从存储部 40 读出的演示数据 1420 进行再生（步骤 8）。

即，由液晶投影机 200 投影演示数据，当有声音时，还要对声音进行再生。



当没有演示数据时（步骤 6），不进行任何外部操作，而是继续进行内部处理。

当有外部输入数据时（步骤 10），控制部 90，一边按每个输入源管理输入数据一边将其存储在存储部 40 内（步骤 12）。

5 具体地说，例如，当传送包含着从图形输入板 410 传送到的绘图指示信息等的传送数据时，不仅存储传送数据而且还同时存储该图形输入板 410 的识别信息等，从而一边用管理表 42 按每个输入源进行管理一边进行存储。

10 另外，传送数据等的一部分，作为附加数据 1440 进行存储。而作为附加数据 1440，不仅包含从图形输入板 410 输入的数据，而且还包含图 2 所示的摄像部 60 的摄像范围 1060 内所含有的摄像数据。即，演示者 1000 用指示棒 1010 或手指指示的图象的位置数据，也作为附加数据 1440 进行存储。

按上述方式生成会议数据 44。

15 当没有外部输入数据时（步骤 10），不进行任何外部操作，而是继续进行内部处理。

另外，当由会议参加者 1002 通过操作遥控器等再生指示装置而发出再生指示时（步骤 14），控制部 90，根据再生指示的指定按每个规定单位读出会议数据 44（步骤 16～20）。

20 例如，如果再生指示是按每个输入源的指定（步骤 16），则按每个输入源再生会议数据 44（步骤 18）。

另外，如果再生指示不是按每个输入源的指定（步骤 16），则对所指定部分的会议数据进行再生（步骤 20）。具体地说，例如，控制部 90，判别所指定的是与演示数据 1420 对应的第几章第几节，  
25 并从存储部 40 读出与该部分对应的会议数据 44。因此，如果再生部 20 对该部分进行再生，则可以再生出所指定部分的数据。

当然，不仅是每个输入源或指定部分这种二者择一的选择，在结构上也可以将两种指定合在一起从而能同时选择两者。

30 按如上所述的方式进行会议数据的生成处理及再生处理。以上是将图形输入板 410 用作输入装置 400 的情况，以下说明将 PC420 用作输入装置 400 的情况。

（将 PC 用作输入装置时的会议系统例）

图 6 是本实施形态的另一例的会议系统的功能框图。

液晶投影机 202, 通过 IEEE1394 总线 300 与外部存储装置 240 连接, 液晶投影机 202 与 PC420 通过光纤网 310 连接。

5 这种会议系统, 在进行联接相隔很远的地区间的会议时采用。这里, 假定从设在美国的 PC420 向设在日本的液晶投影机 202 发出绘图命令。

即, 所说明的例子是, 在日本的会场采用液晶投影机 200 进行演示, 在美国的会议参加者 1002, 一边用 PC420 显示演示画面一边在由日本的液晶投影机 200 生成的演示图象上进行写入。

10 这里, PC420, 在结构上包含具有显示演示画面的 Web 浏览器、OS (操作系统)、TCP / IP (Transmission Control Protocol / Internet Protocol; 传输控制协议 / 网际协议)、PPP (Point to Point Protocol; 点对点协议) 等软件的控制部 422、及具有 ATM 交换机的发送接收部 424。

15 另外, 液晶投影机 202, 在结构上包含具有 CGI (Common Gateway Interface; 公共网关接口)、httpd (Hyper Text Transfer Protocol Daemon; 超文本传送协议守护程序)、绘图用 API (Application Programming Interface; 应用程序设计接口) 等软件的生成部 12、具有虚拟机 502 的变换部 52、具有分散 OS 核心程序、TCP / IP、PPP、设备驱动程序等软件的控制部 92、发送接收部 (包含 ATM 交换机)、  
20 及具有 IEEE1394 总线级驱动器的通信用接口部 32。

另外, 外部存储装置 240, 在结构上包含控制部 290、及具有 IEEE1394 总线级驱动器等的通信用接口部 292。

以下, 说明本会议系统中的会议数据生成处理。

25 首先, 在美国, 在 PC420 的屏面上显示着演示图象的状态下, 操作 PC420 的会议参加者 1002, 在画面的 Web 浏览器上进行用于对演示图象进行写入的操作。

该操作命令, 由控制部 422 变换为以 TCP / IP 等协议为依据的形式, 同时将包含操作命令的传送数据变换成可以由编译器变换为可生成会议数据的数据形式的形式, 并由发送接收部 424 通过光纤网 310  
30 向液晶投影机 202 发送。

在液晶投影机 202 中, 由通信用接口部 32 接收发送到的传送数

据，并由控制部 92 进行传送控制等。发送到的传送数据，用虚拟机 500 变换为可生成会议数据的形式，并由生成部 12 生成会议数据。

从 PC420 发送到的传送数据及所生成的会议数据，由通信用接口部 32 通过 IEEE1394 总线 300 向外部存储装置 240 发送，并在外部存储装置 240 中一边由控制部 290 按每个处理装置及每个规定单位对由发送接收部 292 接收到的传送数据及会议数据进行管理一边进行存储。

另外，所生成的会议数据，用液晶投影机 202 在日本的会场显示，同时由通信用接口部 32 向 PC420 发送。在 PC420 中，将接收到的会议数据再次显示在屏面上。

上述的发送接收处理及数据传输，尽管是传输像会议数据这样的大型数据，但由于采用了 IEEE1394 总线 302 和光纤网 310，所以仍能极高的速度进行。

按照上述方式，在美国的会议参加者 1002，能够以与在日本的会场上操作液晶投影机 202 的同样的感觉从相隔很远的地方操作液晶投影机 202。

另外，传送数据及会议数据存储在外部存储装置 240 内，而且在 PC420 与外部存储装置 240 之间也由高速传输线路连接，所以可以响应从 PC420 进行的操作而立即再生出所需要的部分。

因此，可以实现即使在相隔很远的地区之间进行会议时也能迅速地重放会议数据的会议系统。

进一步，通过将存储会议日志（历史记录）的外部存储装置 240 与投影机 202 分别设置，即使是使构成外部存储装置 240 的硬盘为 RAID（Redundant Array of Inexpensive Disks；廉价盘冗余阵列）结构从而提高数据的可靠性并确保大容量的存储容量时，也能实现通用性高的液晶投影机 202 而无须改变液晶投影机 202 本身的大小。

即使是如上所述将用于存储会议数据的存储装置与液晶投影机 202 分别设置时，也由于能以极高的速度进行液晶投影机 202 与外部存储装置 240 之间的通信，因此几乎不存在性能上的问题。

以上是将 PC420 用作输入装置 400 的例，以下，说明将服务装置用作数据传送装置而对传送数据进行传送的情况。

（将服务装置用作数据传送装置时的会议系统例）



图 7 是本实施形态的另一例的会议系统的功能框图。

本实施例中的会议系统，在结构上包含用于再生会议数据的液晶投影机 200 及服务装置 100。

液晶投影机 200，与上述的液晶投影机 200 相同。

5 服务装置 100，在结构上包含存储着显示用数据、控制用数据、组件对象等的存储部 102、发送接收部 104、及控制存储部 102 及发送接收部 104 的数据传输的控制部 106。

10 这里，作为显示用数据，例如可以是图象数据、演示数据、会议数据等，作为控制用数据，具体地说，例如可以是设备驱动程序、用于指定坐标等绘图范围的数据、用于指定线或圆等绘制对象类别的数据等。

特别是，考虑到图象数据以两种形式生成，因而需要设计处理系统。第 1 种形式是将图象整体作为像素集合而生成。当用图象扫描装置采集自然图象的照片时，将每个像素定义为伴有不同灰度等级的色彩数据，并将图象整体定义为该像素的集合。

15 第 2 种形式是由任何一种命令字产生像素。在利用直线、贝济埃曲线、圆弧等的组合表示图形的处理系统中，直线产生命令（通常是指定绘图起始坐标、终止端坐标、线宽），根据作为对象的处理系统的析像度或坐标系产生点列并形成像素，从而绘制出图形的一部分。

20 在大多数情况下，计算机装置的图象显示系统，用前者的像素集合表示图形，同时用后者的命令字表示图形。此外，采用轮廓字形产生文字的方式，由于原来的文字形状由直线、曲线绘图命令记述，所以是属于后者的例。如后文所述，根据命令字产生像素，是使用多台液晶投影机在大范围区域上绘图的应用例，是需要进行分散处理的最佳例。

25 当根据任何绘图命令产生像素时，必需有进行该操作的程序，而且，该程序必须是可以在包含着作为对象的处理器的硬件上执行的形式。在本实施形态中，将这种程序的执行单位称作「组件对象」。

30 组件对象，用作进行图象生成或再生用的软件的一部分。具体地说，例如可以是 JAVA 小应用程序或 JAVA Beans 等。

例如，假定服务装置 100 是 Web 服务器，并且是将各种用于会议数据生成的数据存储在存储部 102 内的形态。

液晶投影机 200, 可以从服务装置 100 下载设备驱动程序、JAVA 小应用程序等。

按照这种方式, 可以很容易地扩展液晶投影机 200 的功能。即, 当必需召开新形态的会议时, 会议的主办者将必要的信息存储在服务装置 100 内, 会议参加者 1002, 则可将必要的信息从服务装置 100 装入液晶投影机 200, 从而能够迅速地适应新形态的会议。

具体地说, 例如, 在液晶投影机 200 中当前具有在屏面的一部分上画线的功能时, 通过接收具有用圆圈围出屏面的一部分的功能的组件对象并装入会议数据生成用程序, 可以追加用圆圈围出屏面的一部分的功能。

另外, 由于不是用硬件而是可以用软件进行功能扩展, 所以可以对液晶驱动电路等进行简化。即, 一般来说, 在液晶投影机中, 由 AD 转换器将图象数据变换为数字信号, 并将图象信息存储在第 1 帧存储器内。然后, 由数字滤波电路对图象信息进行卷积运算并存储在第 2 帧存储器内。接着, 以一定的周期读出第 2 帧存储器内的图象数据, 以便由液晶控制器将其显示在液晶光阀上。

另外, 这里, 所谓卷积运算, 指的是一种图象滤波技术, 用于根据图象的清晰度改变抽头系数, 从而改变画质。

在这些驱动电路中, 因所输入的图象数据的不同等而造成由相位差引起的图象恶化, 为了减小该相位差, 必须采用高性能的 PLL 电路。此外, 在假定将多台析像度不同的液晶投影机相互连接的情况下, 必需提供用于进行图象插补的图象处理的换算电路。但这种图象处理将会使图象恶化。

另一方面, 如果像本实施形态这样采用使装有虚拟机 500 的液晶投影机 200 的各部动作的应用软件并根据液晶的像素数对输入到液晶投影机 200 的图象数据进行数据变换, 则不会产生因换算电路的图象处理而引起的图象恶化, 由于不需要设置多个帧存储器, 所以能够简化电路结构。

作为这种应用软件, 例如可以采用通过虚拟机 500 将所输入的图象数据的显示图象在 VRAM (视频 RAM) 内展开并进行将 VRAM 内的显示图象通过液晶控制器显示在液晶板上的处理的软件。

以上, 以液晶投影机 200 和输入装置 400 为中心进行了说明, 但

对于液晶投影机 200 和输出装置 600, 也可以获得同样的作用效果。

即, 例如, 用液晶投影机 200 生成会议数据, 并由通信用接口部 30 向输出装置 600 发送所生成的会议数据。

5 这里, 作为输出装置 600, 例如采用打印机时, 会议参加者 1002, 可以根据输出指示打印该会议数据。

另外, 作为输出装置 600, 例如采用显示器时, 会议参加者 1002, 可以根据输出指示显示该会议数据。

10 这种情况下的输出指示, 也可以按每个输入装置 400 及每个规定单位进行, 会议参加者 1002, 可以根据指示立即得到自己请求的会议数据。

如上所述, 虽然会议系统都能以液晶投影机 200 为中心构成, 但如采用控制装置, 则也可以实现新形态的会议系统。

(采用了控制装置的会议系统例)

图 8 是采用了控制装置 900 的会议系统的简图。

15 将 1 个控制装置 900 与进行会议数据处理的多个处理装置通过由作为传输线路的 IEEE1394 总线 300 构成的网络连接, 在各处理装置之间进行传送数据的发送和接收并生成会议数据。

20 控制装置 900, 在结构上包含存储部 910、在管理各处理装置与网络的连接状态的同时还管理存储部 40 内的数据的管理部 920、对控制装置 900 内的数据的传输进行控制的传输控制部 930。

另外, 作为处理装置, 例如可以采用携带式信息终端 402、扫描器 404、液晶投影机 200、PC400、打印机 602 等各种装置。

在这种形态中, 按如下方式进行会议数据的处理。

25 图 9 是表示采用了控制装置 900 的会议系统中的处理流程的流程图。

开始时处于控制装置 900 起动并与 IEEE1394 总线 300 连接的状态, 其他装置也与 IEEE1394 总线 300 连接。(步骤 32)。

30 当连接某个处理装置时, 包含着指示连接后的状态及该处理装置提供的服务的信息包的传送数据被传送到控制装置 900。这里, 所谓服务, 指的是各处理装置提供的功能。

控制装置 900, 当接收包含上述信息包的传送数据时, 由管理部 920 在存储部 910 所存储的管理表中确认已完成登录的提供服务(步

骤 34)，如已登录着同一种提供服务，则对优先级等进行调整（步骤 36）。

管理部 920，在确认提供服务后，将提供服务登录在管理表内（步骤 38）。

5 图 10 是表示管理表 912 的一例的图。

在管理表 912 中，主要存储着用于识别各处理装置的 ID、该处理装置提供的服务、该处理装置的状态。该识别用 ID，即使在多个处理装置与网络连接的情况下，也分配不重复的 ID 值。

10 控制装置 900，当接收包含着指示服务请求的信息包的传送数据时（步骤 40），用管理部 920 检索管理表 912，搜索可提供能够响应该服务请求的服务的处理装置。

例如，当从携带式信息终端 402 发出想要打印会议数据的一部分的请求时，控制装置 900，用管理部 920 检索管理表 912，搜索可提供打印服务的处理装置，当搜索到提供该项服务的打印机 602 后对其  
15 状态进行确认并处于能够进行处理的状态时，传送控制部 930 在请求服务的携带式信息终端 402 与响应该服务的打印机 602 之间建立连接。

一旦建立了连接，就可以在发出请求的处理装置与响应请求的处理装置之间发送和接收会议数据等传送数据而无须再通过控制装置  
20 900。

在这种情况下，例如，建立连接后，将会议数据的一部分从携带式信息终端 402 发送到打印机 602，并由打印机 602 提供打印服务（步骤 42）。

25 这样，如采用控制装置 900，则可以实现能够对服务进行一元化管理并能根据所应用的会议的情况灵活地变更处理装置的会议系统。

即使在这样的会议系统中，也最好在控制装置 900 及各处理装置内安装虚拟机 500。其原因是，通过采用虚拟机 500，在发送传送数据时可以完全不考虑发送目的端的机型或 OS 等，从而可以增加装置  
30 结构的自由度，并能进行更为多样的会议。

作为将上述的控制装置 900 与多个处理装置连接的技术，例如有美国 SunMicrosystems 公司的 Jini，但本实施例在可以将图 4 所示

的会议数据 44 存储在控制装置 900 的存储部 910 内并能进行更新、管理这一点上与 Jini 截然不同。

在以上说明过的例中，说明了 1 个处理装置提供一项服务的例，但以下将对由多个会议数据再生装置提供一项服务、即边进行分散处理边再生会议数据的情况进行说明。

（关于分散处理的说明）

目前的大多数在商用 PC 的 OS 下开发的应用软件，通过编译，翻译为可由微处理器直接解释的机械语言。在这种方法中，一般必须从应用软件的开发生阶段起就必须考虑到使用该应用软件的微处理器的体系结构及与 OS 的服务例程之间的程序间接口（通常称为 API: Application Programming Interface; 应用程序设计接口）并进行程序设计。

可是，在本实施形态的会议系统中，以液晶投影机 200 或用作处理装置 700 的 PC 或 WS 为中心，翻译和执行会议数据 44 或原始演示数据。

液晶投影机 200，每当实际商品化时，即使从以适当的价格为用户提供最佳的装置考虑，在设计时也不能限定于某种微处理器，对于处理装置 700 也可以说是同样的。此外，作为处理装置 700，不仅使用 PC 或 WS，也应设想到使用携带式信息终端，以便在外出要去的地方使用。

当以上述各种规格不同的微处理器及 API 不同的 OS 的混合环境为前提时，为了将各个环境的差别抽象化并提供可以共同使用的环境，应使用虚拟机的解释程序（例如虚拟机 500）。

使用虚拟机的解释程序可以解决的问题，主要是消除不同的计算机体系结构的差别（执行环境的抽象化）。

另一方面，在会议系统中发送接收的传送数据，是动图象这样的大型数据，而且，当会议要进行几小时之久时也要发送接收大量数据。

为能有效地处理这种大型且大量的数据，不仅需要虚拟机的解释程序，而且既需要高速传输线路又需要可以进行在各装置中动态地分散处理负荷的动态分散处理的结构。

图 11 是表示以分散方式进行图象显示时的图象显示的图，（A）



是表示只采用 1 台液晶投影机时的图象显示例的图，（B）是表示采用 4 台液晶投影机时的图象显示例的图。

当以 1 台液晶投影机 200 进行图象显示时，可以由将会议数据传送到液晶投影机 200 的 PC 进行 UXGA 显示、即  $1600 \times 1200$  点的显示，但在该液晶投影机 200 只能对应地达到 XGA 显示、即  $1024 \times 768$  点的显示的状态下，根据演示者的指示，有时指示器将可能指示出可以在 PC 上显示但在液晶投影机 200 上却不可能显示的坐标（1500，920）

在这种情况下，如图 11（A）所示，实际上在液晶投影机 200 上不能显示。因此，由于演示者不能使指示器按照自己的操作而动作，所以也会发生不能进行有效的演示的情况。

为避免发生这种情况，如图 11（B）所示，可以采用 4 台液晶投影机 200，以分担的方式投射 4 个图象 1210-1~4，以便能够支持与 PC 上的显示对应的显示区域。

图 12 是采用 4 台液晶投影机 200-1~4 并以分散方式进行图象显示时的示意图。

当以分担的方式显示 1 个图象时，本来必须决定由哪个装置分担哪个区域。采用 4 台液晶投影机将某个图象在空间上划分后进行显示，是典型的并行处理方式。在用处理装置 700 的应用软件生成原始演示文件的阶段，如果记述适用于这种并行处理的并行句法，则在处理上是很方便的。在特开平 6-4498 中，公开了一种书写和翻译 cobegin coend 中包含的并行执行单位的方法，这种方法在本实施形态中也可以使用。

图 13 是表示采用了虚拟机 500 时的通信方式的示意图，（A）是表示现有通信方式的图，（B）是表示本实施形态的通信方式的图。

为进行上述的动态分散处理，不仅需要在投影机 200 内安装虚拟机 500，而且在生成应用软件、即应用层程序 12 的阶段必须在充分考虑由哪台液晶投影机 200 分担哪个绘图区域后生成。

一般来说，为了对程序的某个执行单位进行并行处理，必须满足以下的 2 个条件。首先，第 1 个条件是，包含 OS 的对象程序处理系统必须具有可以平行地执行某个程序片、亦即执行单位的资源，更具体地说，必需有与并行处理的个数相对应的独立的处理装置。第 2 个条件是，必须将对象程序本身记述为具有可并行执行的处理单位且可

以在处理系统中对其进行判断。

另外，在本实施形态中，所谓「分散执行」，是并行执行的广义概念，在将某个处理单位分散到其他处理系统执行的情况中，将希望在时间上平行处理而且在取得结果的时刻必须同步的特殊情况称作「并行执行」。

例如，如图 13 (A) 所示，在将 2 台液晶投影机 200-5、6 通过 IEEE802.3 总线 192 连接的情况下，应在各应用层程序 12-5、6 之间建立在图象上相互呼应的连接。当开始对原始演示数据进行解释的第 1 台液晶投影机 200-5 在程序的语句中检测到超出了自己的显示范围时，便试着要与液晶投影机 200-6 对该部分进行分散处理。

这时，作为具体的动作，读取液晶投影机 200 的内置 OS 的传输控制程序的控制部，通过 IEEE802.3 总线 192 打开与液晶投影机 200-6 连接的线路，并传输分散处理的对象范围。

应用层程序 12-5，必须利用内置 OS 的服务例程依次执行网络连接、线路的打开，处理部分的传输等处理。另一个应用层程序 12-6，则被要求执行同样的网络连接、容许线路打开，处理部分的接收等服务侧的处理。

为了使用多台液晶投影机，只要求进行上述这些处理就使作为原始演示文件记述的应用层程序 12-5、6 的规格变得很复杂了，每次都必须根据执行环境专门改写。

如上所述，这里看到的应用层程序 12，实际上是由用于生成演示资料的另一个应用层程序生成的原始演示数据。如图 4 中的例所示，原始演示数据的内容，可以解释为由虚拟机 500 执行的中间语言对象的命令字集合。

为方便使用，必须设计成从开始时在应用层程序中就以一定程度的并行处理为前提交叉地记述着多种并行句法，并当执行环境允许并行处理时可以并行地执行。作为代替方法，也可以由虚拟机 500 在执行阶段以动态且独立的方式与其他虚拟机相互通信并将处理分散。

作为前者的预先记述多种并行处理句法的方法，可以安装本申请人在特开平 6-4498 中公开的中间语言解释程序间的通信方式。

另外，作为后者的在执行阶段以动态且独立的方式与其他虚拟机相互通信的方式，例如，可以采用使用 JAVA 虚拟机实现的方法、基

于多节点的方法等。

通过采用上述方法，即使是在液晶投影机的台数增加到 16 台、64 台等情况下，也无需再次改写原始演示数据。

在本实施形态中，如图 13 (B) 所示，采用了实现各节点之间的  
5 存储资源远距离访问的 IEEE1394 总线 300。

在安装本申请人在特开平 6—4498 中公开的中间语言解释程序  
间的通信方式的情况下，某台液晶投影机 200—1 的虚拟机 500—1 的  
主解释程序，在装入阶段，将以中间语言在作为所执行的进程的从属  
侧解释程序的工作区内记述的对象代码读入到另一台液晶投影机  
10 200—2 的存储空间上，然后读入栈初始化数据，并根据该数据的指示  
将初始状态的数据存储在栈内并设定栈指针。

接着，读入表初始化数据，并进行对执行时数据块管理表及共享  
资源管理表的内容进行初始设定的一系列动作。上述动作，可以借助  
于采用了 RS232C 串行线路等的通信、或安装于通常在 UNIX 系统的  
15 OS 中见到的网络文件系统等的传送层以上的上位层协议实现。但是，  
为了能以现实的处理速度进行远距离存储器访问，必须通过  
IEEE1394 的总线事务处理进行安装。

按照这种方式，当生成应用层程序 12—1、2 时，无须考虑绘图  
分担区域等即可生成，并且可以在比应用层程序 12—1、2 低 1 级的  
20 各虚拟机 500 之间在图象上建立虚拟的连接。

以下，详细说明将 JAVA 虚拟机用作虚拟机 500 时的本实施形态  
的分散处理。

图 14 是进行本实施形态的分散处理时的功能框图。

液晶投影机 200—1，包含安装有用于将从作为数据传送装置的  
25 其他液晶投影机 200—2 等传送的传送数据变换为可生成或再生的数  
据形式的虚拟机 500 的变换部 50、及用于从输入装置 400 接收可由  
变换部 50 变换的传送数据的通信用接口部 30。

另外，液晶投影机 200，还包含根据由变换部 50 变换后的传送  
数据生成会议数据的生成部 10、一边按每个其他的液晶投影机 200  
30 且按每个规定单位对所生成的会议数据进行管理一边将其存储在存  
储部 40 内并按每个其他的液晶投影机 200 且按每个规定单位读出会  
议数据的控制部 90、及对所读出的会议数据进行再生的再生部 20。



在存储部 40 内, 除了包含着演示用数据及所传送到的传送数据的会议数据以外, 还存储着由控制部 90 使用的管理用表 42 等。

另外, 存储部 40, 可以由其他的液晶投影机 200 等通过通信用接口部 30 访问。

5 以下, 说明本实施形态中使用的虚拟机 500。

图 15 是投影机 200 中的软件部和硬件部的功能框图。

软件部, 在结构上包含具有声音处理用 API(Application Programming Interface; 应用程序设计接口) 及图象处理用 API 的生成部 10、具有多个命令字、对命令字的调度程序、多个设备驱动程序、运行期程序库的控制部 90、及虚拟机 500。

另外, 也可以代替声音处理用 API 或图象处理用 API 而安装声音处理级或图象处理级。

所谓本实施形态中使用的虚拟机 500, 意味着读取通用的文件格式并因此可以进行所指定的操作的装置, 具体地说, 例如采用 JAVA 虚拟机或上述特开平 6-4498 中公开的装有可进行并行处理的解释程序的虚拟机等。

作为 JAVA 虚拟机的安装方式, 可以采用安装在软件部的解释程序方式、编译方式、安装在硬件部的专用 CPU 方式等, 但在本实施形态中安装在软件部内。

20 虚拟机 500, 在结构上包含各具有 1 个程序计数器和 1 个栈的多个线程、及堆区域。即, 栈和堆区域是工作区, 也起着存储部 40 的作用。

另外, 由于栈有多个, 所以能够进行所谓的多线程处理。因此, 可以提高分散处理时的执行性能及并行执行性。

25 另外, 硬件部, 在结构上包含装有显示部的再生部 20、具有视频控制器的控制部 90、具有视频 RAM (V-RAM) 区域的存储部 40、及具有 IEEE1394 链路层和 IEEE1394 物理层的通信用接口部 30。

以下, 说明采用了多台液晶投影机 200-1、2 的实际显示处理。

30 假定液晶投影机 200-1 用作主投影机, 而液晶投影机 200-2 用作从属投影机。

假定液晶投影机 200-1 绘制图象 1210-1、即坐标 (0, 0) ~ 坐标 (1024, 768)。该绘图信息存储在存储部 40 内。

当第 2 台液晶投影机 200-2 连接于 IEEE1394 总线 300 时，用作主投影机的液晶投影机 200-1 与用作从属投影机的液晶投影机 200-2 可以发送和接收传送数据。

5 在这一阶段，液晶投影机 200-2 可以判断液晶投影机 200-1 已经动作，同时参照液晶投影机 200-1 的存储部 40-1 的绘图信息，从而可以确认液晶投影机 200-1 分担的绘图区域。

液晶投影机 200-2，在该确认后，从液晶投影机 200-1 的存储部 40-1 读出应由自己显示的图象信息并由虚拟机 500 变换为可由自身装置处理的数据形式而写入 V-RAM 区域，并在视频控制器的控制  
10 下在显示部上进行显示。

如上所述，存储部 40 内的栈区域按每个线程提供。即使某个线程内的栈区域因多线程处理而处于使用之中，也仍可以使用其他线程的栈区域，所以即使在共享存储部 40 的情况下，其并行执行性也几乎没有降低。

15 另外，通过采用 IEEE1394 总线 300 及 IEEE1394 总线接口，可以高速地发送和接收传送数据，所以，即使在共享存储部 40 的情况下，各液晶投影机 200 也都能以与参照自己的存储部 40 几乎相同的速度参照其他液晶投影机 200 的存储部 40。

20 另外，例如，有时也可以是显示能力不同的液晶投影机 200 混合存在的情况，即某台液晶投影机 200 是 VGA 显示、即  $640 \times 480$  点显示，另一台液晶投影机 200 是 SVGR 显示、即  $800 \times 600$  点显示，而另外一台液晶投影机 200 是 XGR 显示、即  $1024 \times 768$  点显示。

在上述情况下，即使是必须显示上述的坐标（1500，920）时，也可以通过将具有不同显示能力的液晶投影机 200 相互连接而进行  
25 显示。例如，如果主液晶投影机 200 是 VGR 显示、则如将全部 9 台液晶投影机 200 连接，则可以覆盖  $1920 \times 1440$  点的显示区域，因此也就可以显示出坐标（1500，920）。

即使在这种情况下，从属液晶投影机 200 也可以通过参照主液晶投影机 200 的存储部 40 内的绘图信息而自动调整显示能力。  
30 这样，由于可以通过有效的分散处理生成会议数据，所以即使是大型且大量的会议数据也能舒畅地生成和再生，因而可以实现响应快的会议系统。

另外，不仅是基于共享存储器方式的分散处理实现方式，也可以按对象传送方式进行上述的分散处理。

以上，说明了实现会议系统的方法，但也可以用计算机可读取的信息存储媒体实现取得上述作用效果的会议系统。

5       （关于信息存储媒体的说明）

图 16 是本实施形态一例的信息存储媒体的功能框图。

信息存储媒体 1400，将用于实现上述各种功能的信息存储在用于由计算机 1200 读取的存储信息内。

10       计算机 1200，在结构上包含用于通过通信线路 1300 与其他处理装置 1100 进行通信的发送接收部 1230、存储各种数据和程序等的存储部 1240、进行图象处理等的处理部 1250、进行图象显示等数据的再生的再生部 1220、从信息存储媒体 1400 读取信息的信息读取部 1290。

15       作为上述各部的硬件结构，例如，作为发送接收部 1230，可采用具有 IEEE1394 接口的通信设备、ATM 交换机等，作为存储部 1240，可采用 ROM、RAM 等，作为再生部 1220，可采用显示器、投影设备等，作为处理部 1250，可采用 CPU、图象处理用处理器等。

另外，作为信息存储媒体 1400，例如可以采用由激光读取信息的 CDROM 或 DVDROM 等、借助于磁性读取信息的硬盘、或存储器等。

20       此外，也可以不是将信息存储媒体 1400 直接连接于信息读取部 1290，而是由计算机 1200 通过通信线路 1300 下载和读取服务装置内的存储信息 1410。

另外，作为传输线路即通信线路 1300，例如可以采用 IEEE1394 总线、光纤等。

25       这里，例如当实现上述的日志功能时，存储信息 1410，是从多个处理装置 1100 通过传输线路即通信线路 1300 接收传送数据并生成反映该传送数据的会议数据的信息，该信息在结构上包含演示用信息、用于一边按上述每个处理装置 1100 管理上述传送数据一边将其存储在存储部 1240 内的存储用信息、用于根据会议参加者的再生指示从存储部 1240 读出包含着上述传送数据及上述演示用信息的至少一部分的会议数据的读出用信息。

按照这种方式，会议参加者，可以根据指示立即重放过去的会议数据。

另外，上述读出用信息，最好是包含用于根据再生指示按每个处理装置 1100 读出存储在存储部 1240 内的上述会议数据的信息。

按照这种方式，可以判别出从哪个处理装置 1100 接收到什么样的传送数据。

5 另外，也可以对反映每个处理装置 1100 的传送数据的会议数据进行再生。具体地说，例如，当多个会议参加者使用其各自的输入装置传送输入数据时，可以按每个输入装置、即每个会议参加者进行重放。

10 另外，最好是，存储信息 1410 包含用于对会议情况进行摄像的信息，上述存储用信息包含用于按规定单位将摄像数据作为上述会议数据的一部分存储在存储部 1240 内的信息，上述读出用信息包含用于根据上述再生指示按上述每个规定单位读出存储在存储部 1240 内的上述会议数据的信息。

15 按照这种方式，可以立即对会议情况的摄像结果进行再生。由于在摄像对象中不仅包含所再生的演示数据，而且还包含演示者的动作，所以能够适当地掌握会议情况。

同样，最好是，存储信息 1410 包含用于对会议情况进行录音的录音用信息，上述存储用信息，按规定单位将录音数据作为上述会议数据的一部分存储在上述存储装置内。

20 按照这种方式，由于还可以将声音合在一起进行再生，所以能够进一步适当地掌握会议情况。

这里，作为上述的规定单位，例如可以采用章单位、节单位、页单位等。即，例如，如果会议参加者发出第 3 章第 2 节部分的再生指示，则可以立即对该部分进行重放。

25 另外，存储信息 1410，最好还包含用于对上述读出的信息进行再生的信息。

按照这种方式，通过显示、投影、声音再生等对读出的会议数据进行再生，从而使会议参加者可以立即确认会议数据。

30 另外，存储信息 1410，最好还包含用于将上述的读出信息向处理装置 1100 传输的信息。

按照这种方式，可以用例如显示装置、打印装置等处理装置 1100 执行对会议数据的再生、打印等。

另外，为了提高上述的相互连接性，可以按如下的方式构成存储信息 1400。

例如，将存储信息 1410 构成为包含用于安装虚拟机 500 并由虚拟机 500 解释接收到的传送数据的解释用信息及用于根据该解释结果生成上述会议数据的生成用信息。

按照这种方式，通过采用将传送数据的形式通用化并变换为可由装置本身解释该传送数据的虚拟机 500，很容易进行处理装置间 1100 及计算机 1200 间的数据交换。由此，可以实现能灵活更换各种处理装置的会议系统。

另外，作为另一种结构，将存储信息 1410 构成为包含用于生成可由虚拟机 500 解释的传送数据的信息及用于传送所生成的传送数据的信息。

按照这种方式，通过将传送数据的形式通用化并生成和传送可由其他处理装置 1100 中的虚拟机 500 解释的传送数据，使接收到该传送数据的处理装置无须考虑传送数据的传送装置的机型或制造厂商即可处理传送数据。因此，能使各处理装置 1100 间的数据交换易于进行。由此，可以实现能灵活更换各种处理装置 1100 的会议系统。

进一步，作为另一种结构，将存储信息 1410 构成为包含演示用信息、用于一边对包含着从具有多个输入装置的上述处理装置传送的上述输入数据的已进行过上述解释的状态的传送数据按上述每个输入装置进行管理一边将其存储在存储装置内的存储用信息、及用于根据再生指示从上述存储装置再生包含着上述输入数据及上述演示用信息的至少一部分的会议数据的再生用信息。

按照这种方式，会议参加者，可以根据指示立即过去的会议数据进行重放。

另外，最好是，上述存储用信息，包含用于一边对包含着上述输入数据的已进行过上述解释的状态的传送数据按每个处理装置 1100 进行管理一边将其存储在存储部 1240 内的信息，上述再生用信息，包含用于根据上述再生指示按上述每个处理装置从上述存储装置再生包含着上述传送数据及上述演示用信息的至少一部分的会议数据的再生用信息。

按照这种方式，会议参加者，通过发出按每个处理装置对过去的



会议数据进行再生的指示，可以按每个处理装置 1100 进行重放。

具体地说，例如，当多个会议参加者使用其各自的输入装置传送输入数据时，可以按每个输入装置、即每个会议参加者进行重放。

5 另外，最好是，存储信息 1410 包含用于对会议情况进行摄像的信息，上述存储用信息包含用于按规定单位将包含摄像结果的上述传送数据存储存储在存储部 1410 内的信息，上述再生用信息包含用于根据上述再生指示按上述每个规定单位再生存储在存储部 1410 内的包含上述摄像结果的传送数据。

10 按照这种方式，可以立即对会议情况的摄像结果进行再生。由于在摄像对象中不仅包含所再生的演示数据，而且还包含演示者指示的图象等附加信息，所以能够适当地掌握会议情况。

另外，这里，作为上述的规定单位，例如可以采用章单位、节单位、页单位等。即，例如，如果会议参加者发出第 3 章第 2 节部分的再生指示，则可以立即对该部分进行重放。

15 另外，上述传送数据，最好包含图象数据、图象生成用对象、图象生成控制用对象、图象显示用对象、图象显示控制用对象中的至少一种。

按照这种方式，可以实现能够有效地交换会议中使用的各种数据的会议系统。

20 另外，上述传输线路，最好在结构上包含 IEEE1394 总线。

按照这种方式，可以在各处理装置之间高速地交换传送数据等。特别是，虽然图象数据等传输数据量很大，但通过采用 IEEE1394 总线而仍能很容易地进行实时处理。

25 以上是用于提高相互连接性的存储信息 1410 的结构，以下，说明用于提高分散处理的数据处理效率的存储信息 1410 的结构。

例如，将存储信息 1410 构成为用于一边在通过传输线路即通信线路 1300 连接的多个处理装置 1100 之间发送和接收可由虚拟机 500 解释的通用形式的传送数据并进行分散处理一边生成会议数据的信息，并使该信息包含用于安装与其他处理装置 1100 共享存储部 1240  
30 用的通信用接口部 30 的信息。

按照这种方式，可以提供可由各处理装置 1100 访问的存储部 1240。由于实现这种存储方式，所以在分散处理中是特别有效的。

这里，上述传输线路，最好是 IEEE1394 总线，上述通信用接口部，最好是 IEEE1394 总线接口。

按照这种方式，可以使各处理装置 1100 就好像访问自身装置的存储区域一样高速地访问该共享的存储部 1240。

5 另外，作为另一种结构，将存储信息 1410 构成为用于一边在通过传输线路即通信线路 1300 连接的多个处理装置 1100 之间发送和接收可由虚拟机 500 解释的通用形式的传送数据并进行分散处理一边生成会议数据的信息，该信息在结构上包含用于生成上述通用形式的传送数据的信息、及用于向具有可由各处理装置 1100 访问的存储部的至少 1 个处理装置 1100 发送所生成的上述传送数据的信息。

按照这种方式，通过生成通用形式的传送数据并存储在共享形态的存储装置内，使各处理装置可以访问该存储部并取得传送数据，因而在分散处理中是特别有效的。

15 例如，在将 JAVA 小应用程序用作传送数据时，可以使多个处理装置同时下载存储在存储装置内的 JAVA 小应用程序，并能够很容易地进行规格变更或功能扩展等。

这里，上述传输线路，最好是 IEEE1393 总线。

按照这种方式，可以使各处理装置就好像访问自身装置的存储区域一样高速地访问所共享的存储区域。

20 另外，作为另一种结构，最好将存储信息 1410 构成为用于一边在通过传输线路连接的多个处理装置 1100 之间发送和接收可由虚拟机 500 解释的通用形式的传送数据并进行分散处理一边再生会议数据的信息，并将其构成为包含用于对具有可由各处理装置 1100 访问并存储着上述会议数据的存储部的至少 1 个上述处理装置 1100 读取存储在上述存储部内的上述会议数据的读取用信息、及用于再生所读取的图象数据的再生用信息。

30 另外，其中，上述读取用信息，在结构上包含用于生成指示读取请求的传送数据并将其变换为上述通用形式的传送数据的信息、及用于向具有上述存储部的处理装置 1100 发送变换后的传送数据并从该处理装置 1100 接收包含着会议数据的传送数据的信息，上述再生用信息，在结构上包含用于安装虚拟机 500 的信息、及用于根据接收到的传送数据用虚拟机 500 变换传送数据并对会议数据进行再生的信

息。

按照这种方式，通过采用通用形式的传送数据，可以适应 OS 或制造厂商的不同并能接收和显示图象数据而无须考虑图象提供侧的装置类别。

5       另外，作为另一种结构，最好将存储信息 1410 构成为用于一边在通过传输线路连接的多个处理装置 1100 之间发送和接收可由虚拟机 500 解释的通用形式的传送数据并进行分散处理一边生成会议数据的信息，并使其包含用于对其他处理装置 1100 请求规定的服务的请求用信息、及用于向其他处理装置 1100 提供规定的服务的提供用  
10       信息。

其中，上述请求用信息，包含用于生成指示上述规定的服务请求的传送数据并将其变换为上述通用形式的传送数据的信息、及用于向其他处理装置发送变换后的传送数据的信息，上述提供用信息，包含  
15       用于安装虚拟机 500 的信息、用于从其他处理装置接收指示服务请求的传送数据并用虚拟机 500 加以变换的信息、用于根据变换后的传送数据判断是否可以提供该项服务的信息、及当可以提供该项服务时用于提供该项服务的信息。

按照这种方式，可以使各处理装置一边相互交换信息一边以分担的方式进行图象处理。例如，如果由投影机请求打印服务，则可提供  
20       打印服务的打印机响应该请求而进行打印。

这种分散处理，也可以通过采用虚拟机 500 并使传送数据为通用形式从而简化各处理装置 1100 之间的数据交换来实现。

另外，上述传送数据，最好是包含会议数据、会议数据生成用对象、会议数据生成控制用对象、会议数据再生用对象、会议数据再生  
25       控制用对象中的至少一种。

按照这种方式，由于这些数据或对象已统一为通用形式，所以可以提高分散处理中的各种图象处理的通用性。

另外，上述传输线路，在结构上最好是包含 IEEE1304 总线。

按照这种方式，可以使各处理装置 1100 就好像访问自身装置的  
30       存储区域一样高速地访问所共享的上述存储装置。此外，还可以使各处理装置以高速进行上述的信息交换，因而能提高处理速度。

（变形例）



本发明的应用并不限于上述的实施例，可以应用于各种变形例。

例如，作为上述传输线路，说明了采用了 IEEE1394 总线 300 的实施例，但只要是高速传输线路则可以采用各种形式。具体地说，例如，可以采用光线信道或卫星通信线路等。

5 另外，在上述实施例中，说明了采用 2 个会议数据再生装置（液晶投影机 200）的分散处理，但采用 2 个会议数据生成装置、或 1 个会议数据生成装置和 1 个会议数据再生装置进行分散处理，也包括在本发明的应用范围内。

10 另外，作为演示中使用的数据，主要是所采集的声音、作为声音识别结果而得到的字符代码、在图形输入板等数字化装置上通过手写字符识别而得到的字符代码等二次信息的附加。对于这些识别处理，如采用在信息处理系统的运算功能上优越的 DSF（Digital Signal Processor；数字信号处理器），则可以实现高速的处理。从上述实施例可以清楚地看出，本发明的分散处理，基于虚拟机接口之间的通信  
15 及独立的处理分散。

如果是在现有的方式下，则为了使用 DSP，必须使应用软件（应用层程序）生成 DSP 所固有的特殊机器语言并由 DSP 系统传送和执行。但是，如采用本发明，则可以在通过 IEEE1394 总线连接的 DSP 系统上安装虚拟机解释程序，并应用于处理分散。其结果是，可以使  
20 用 DSP 的优异计算能力资源，而无须重写作为应用层程序的原始演示文件。

进一步，如上所述，用于实现本发明的程序语言，不限于 JAVA。存在着多种可以生成虚拟机的机器语言并能以上述机器语言级支持对处理器资源进行多路复用处理的语言。在这种语言中，可以进行与  
25 本发明中的上述绘图命令的记述相同的记述。本发明，可以使用不依赖于可达到用来生成绘图命令字的程度的高级语言级的句法词法分析规格的各种语言实现。

产业上的可应用性

30 本发明，可以应用于演示者用个人计算机和投影机对听众进行演示时适用的会议系统。

# 说明书附图

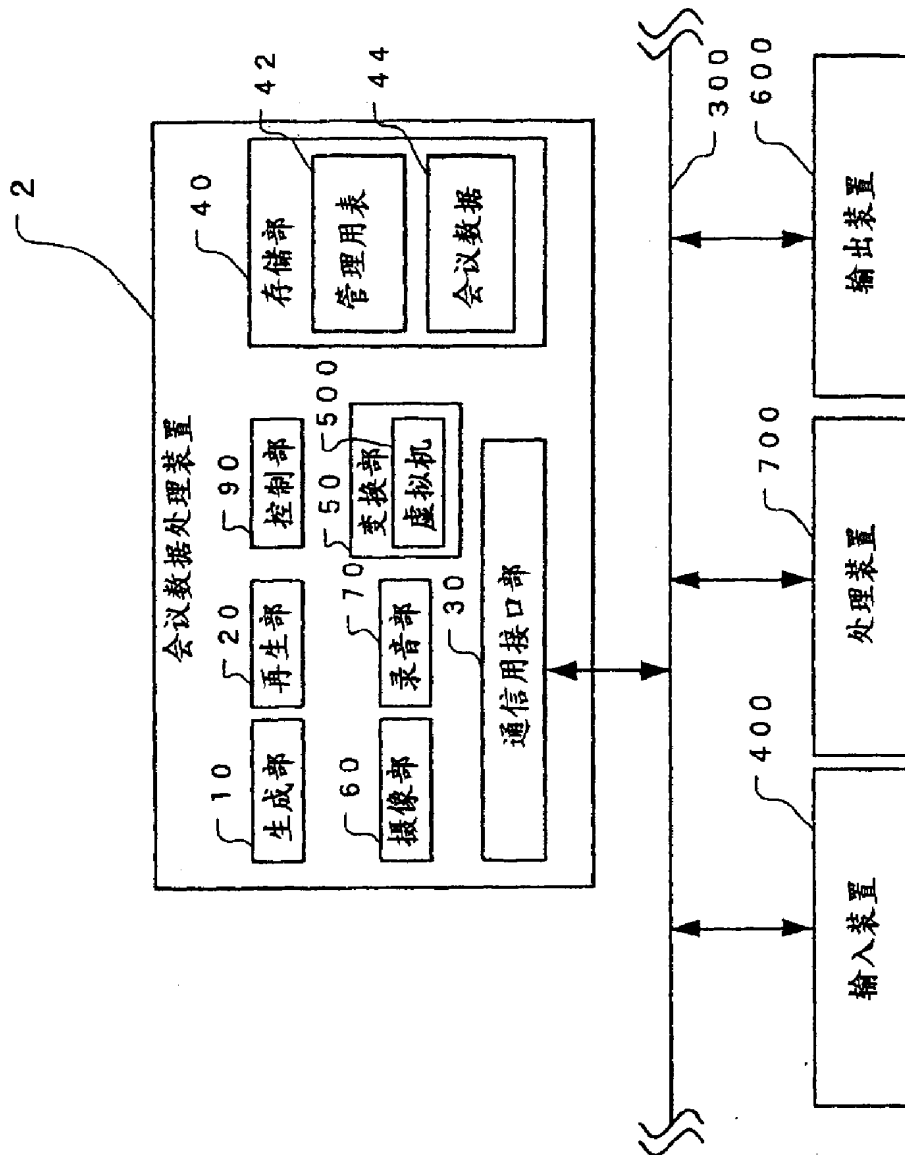


图 1



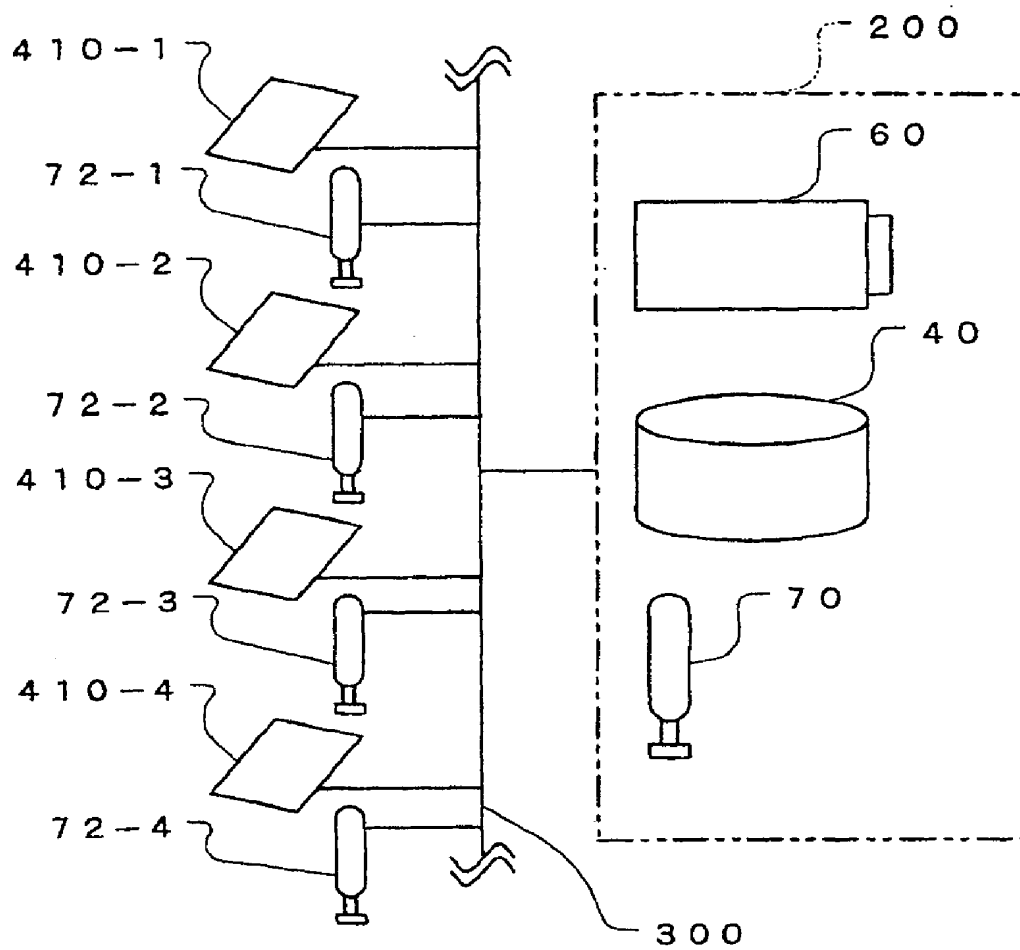


图 3

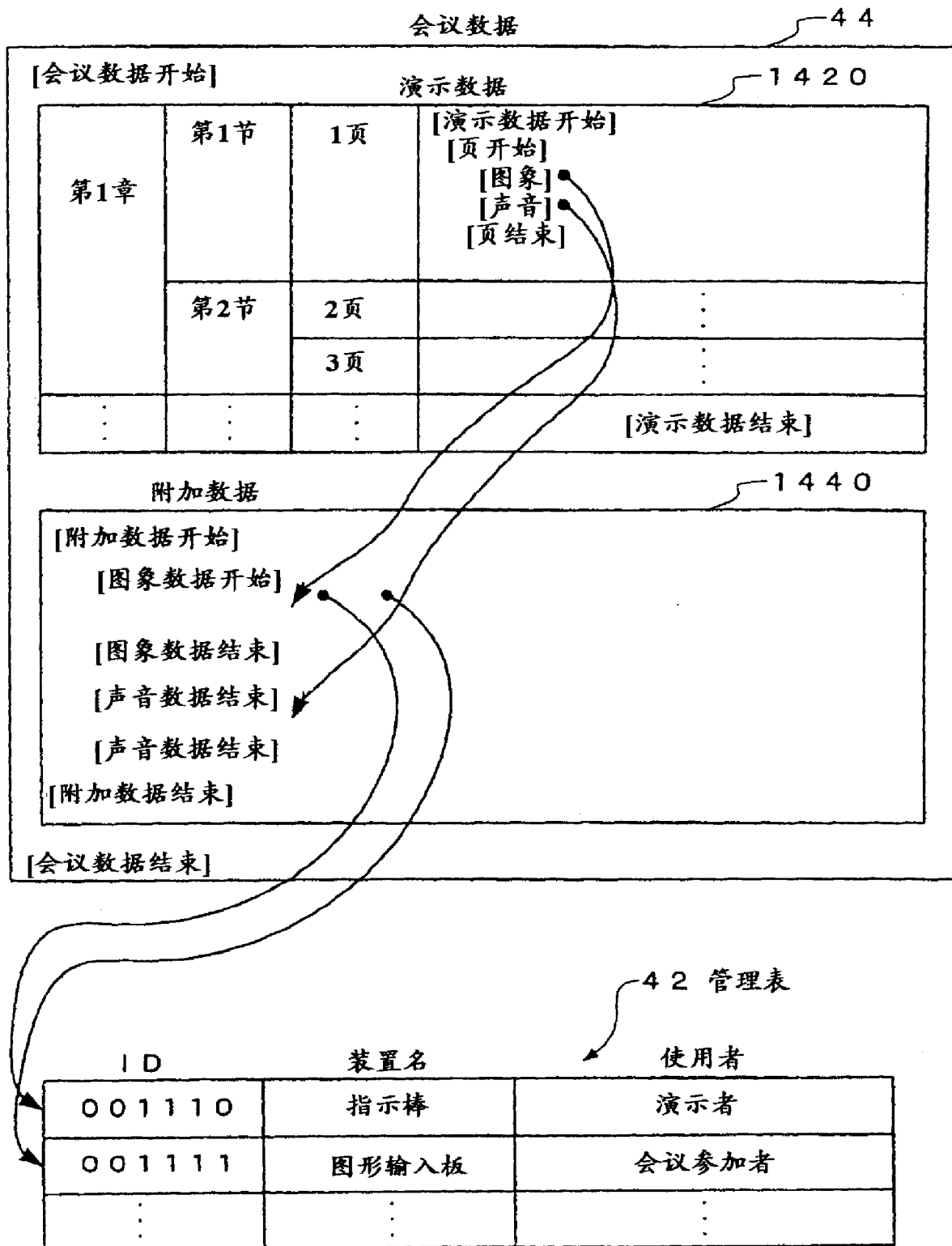


图 4

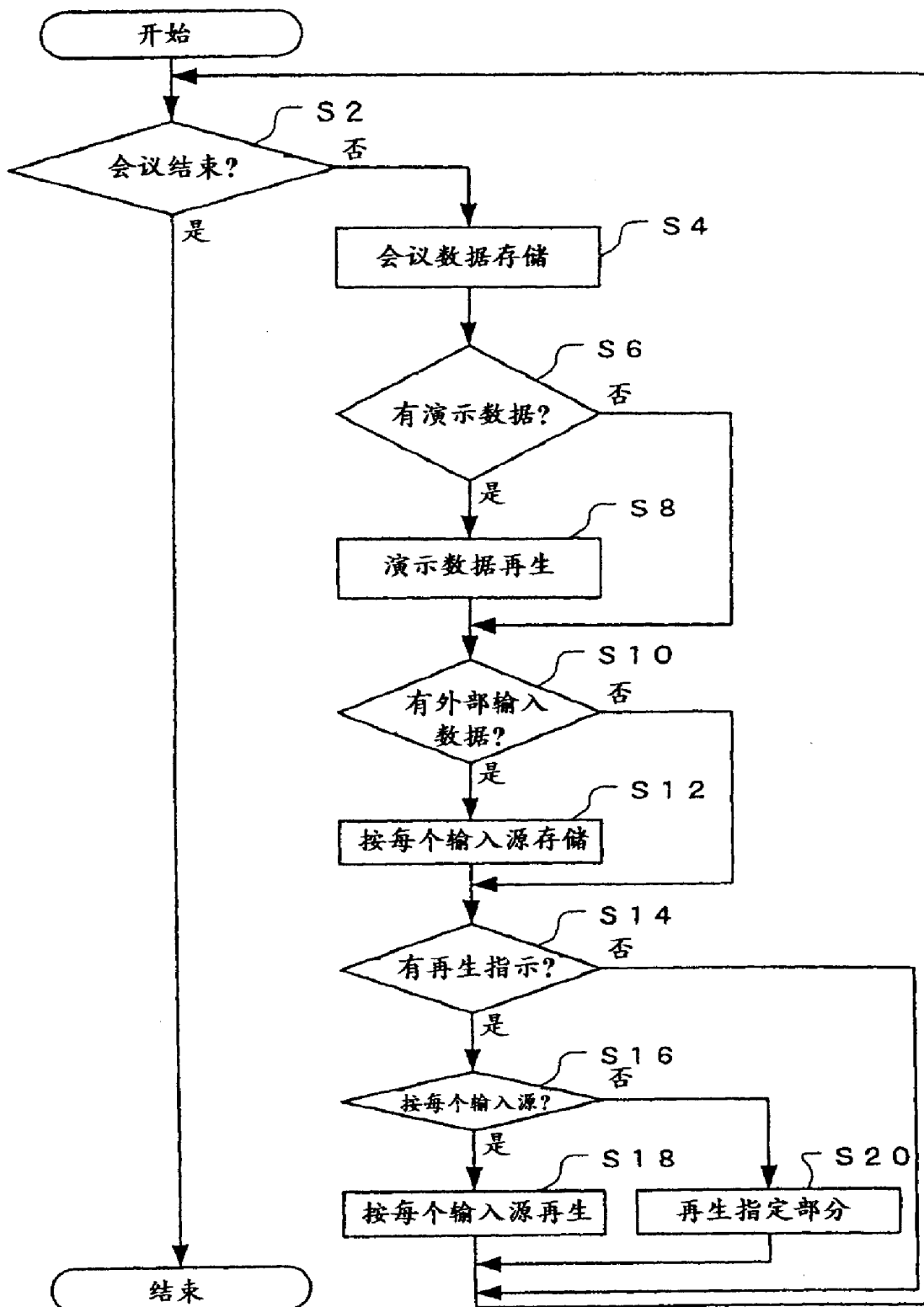


图 5

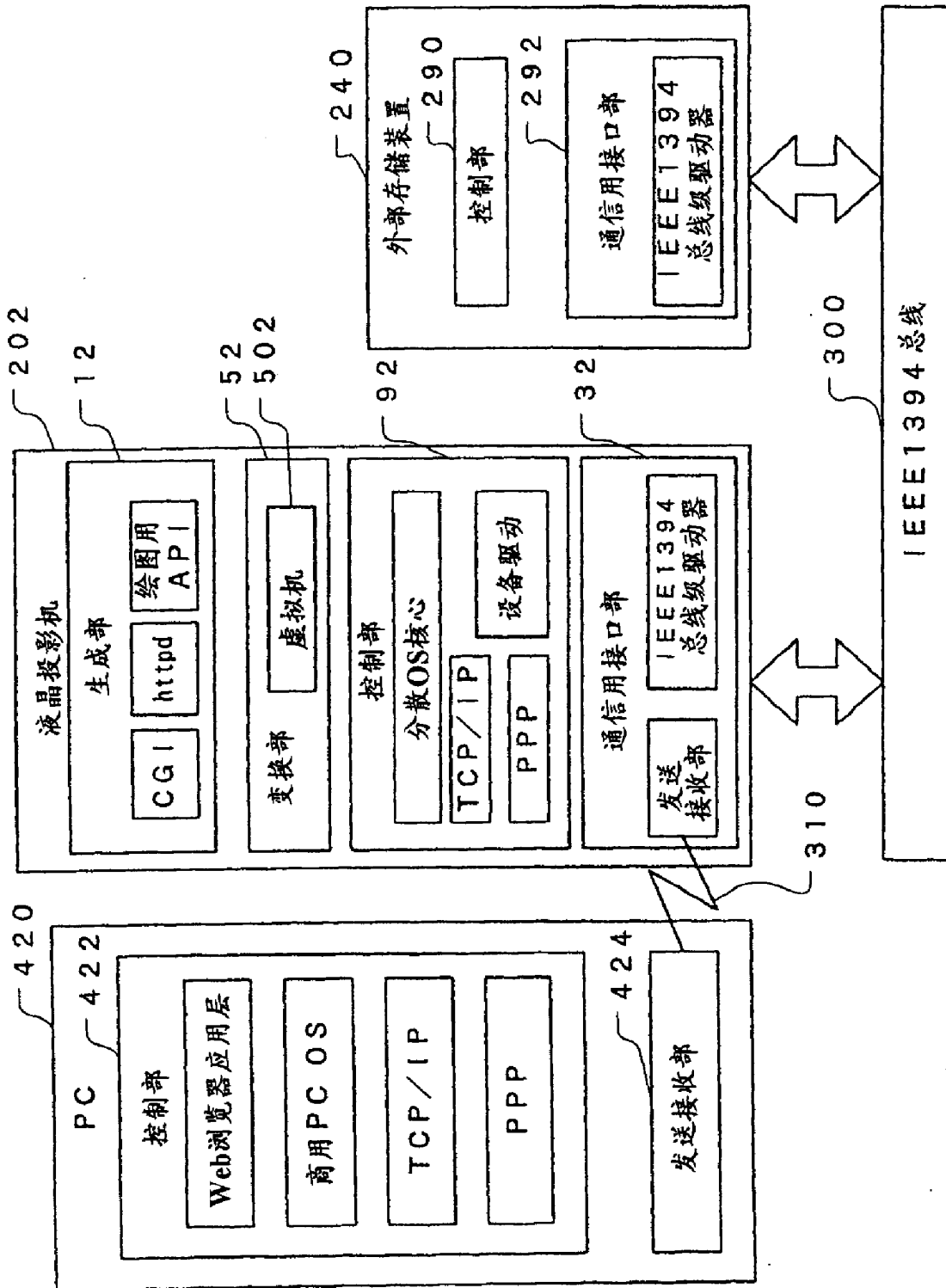


图6

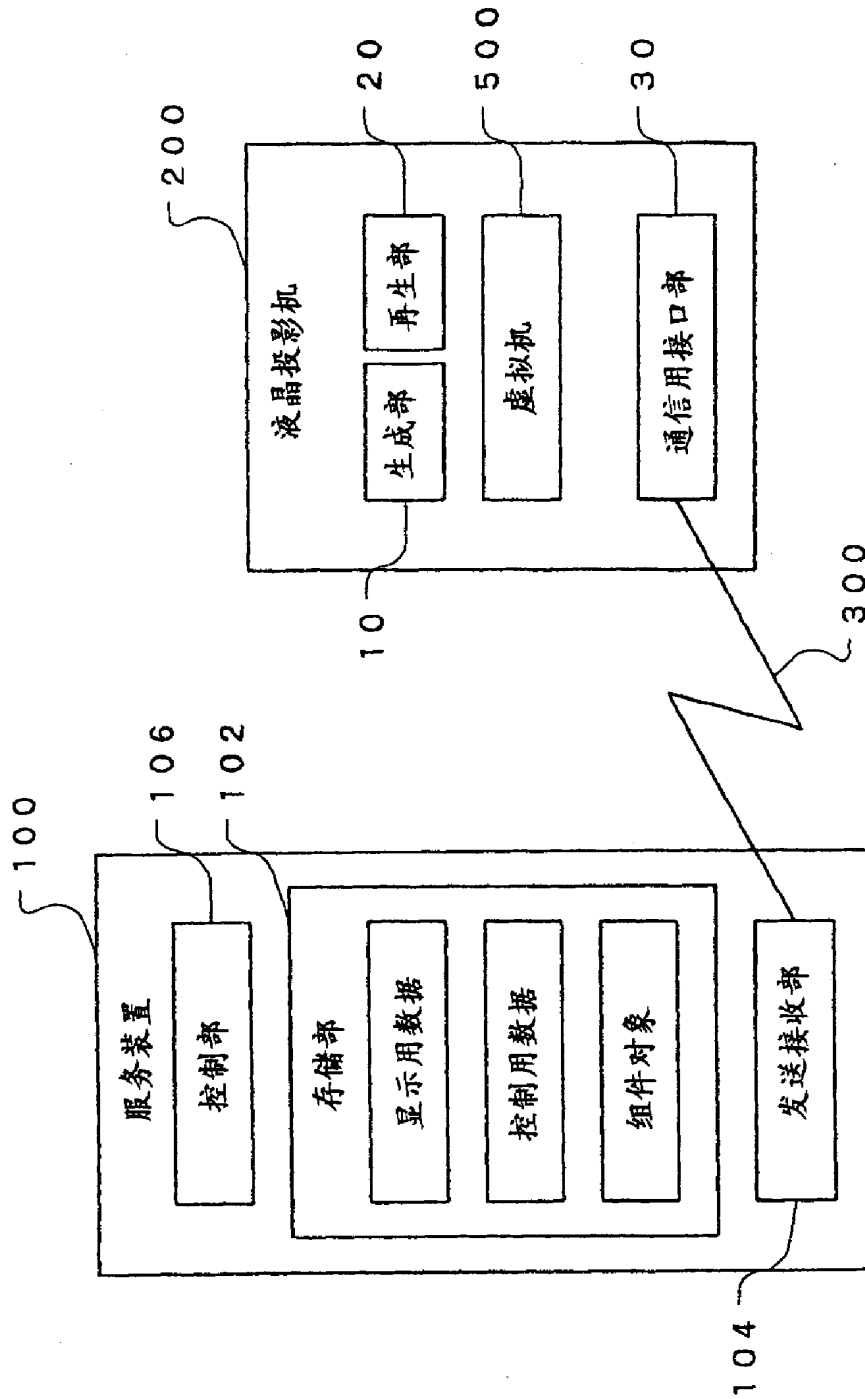


图 7



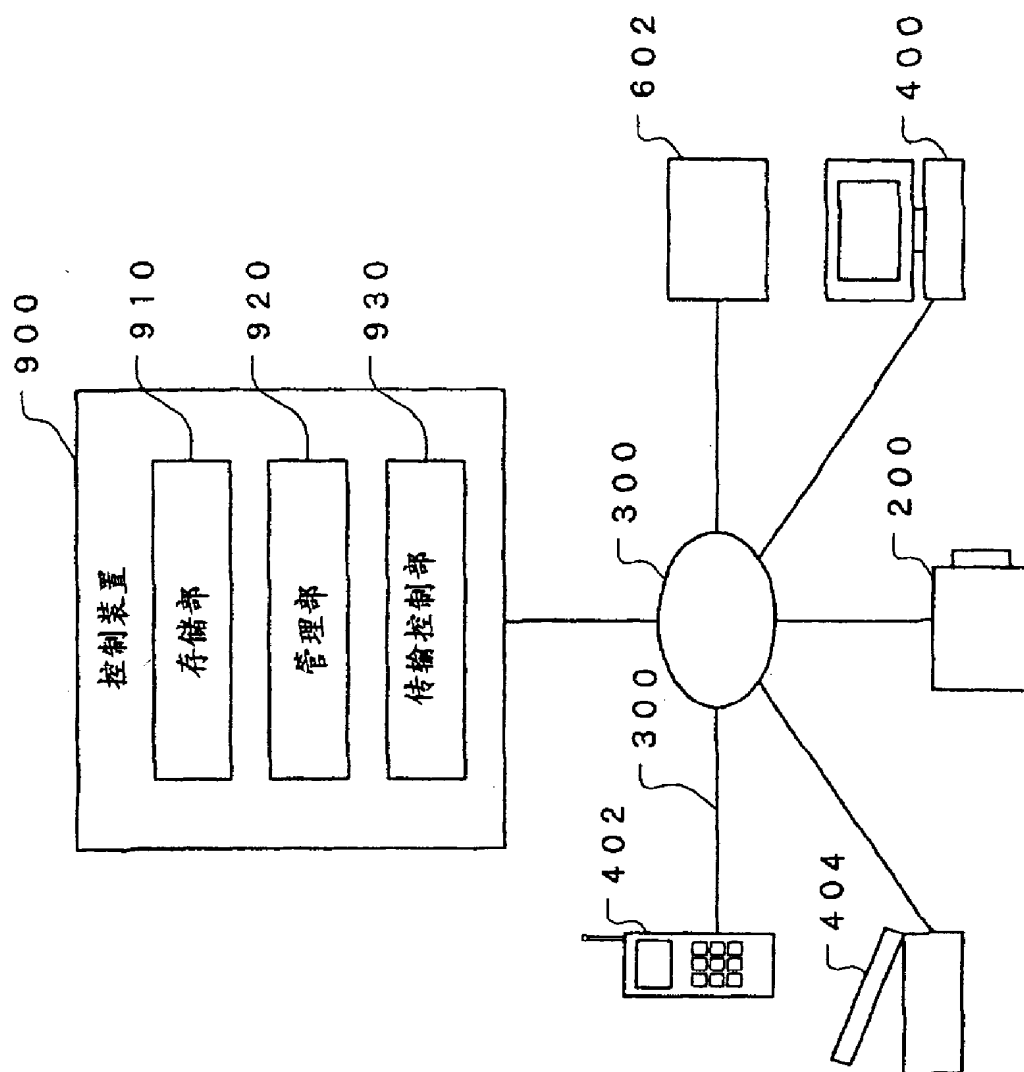


图 8

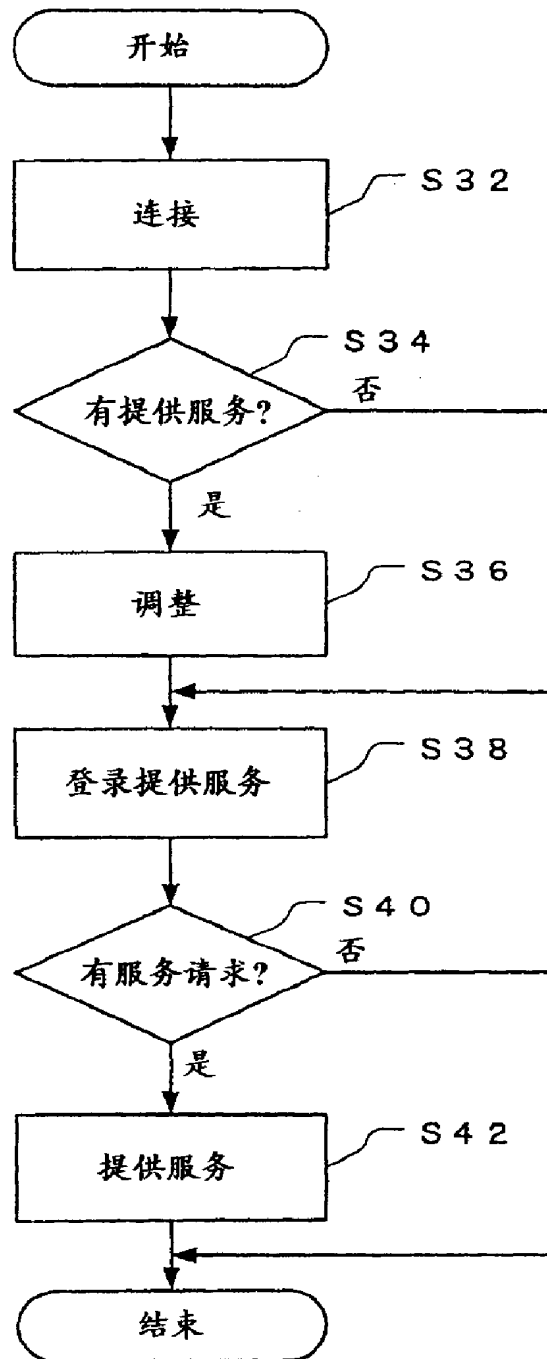


图 9

912

ID	提供服务	状态
...005	命令	可执行
...004	二维数据及三维数据的读取	执行中
...001	投影	执行中
...002	命令、运算、显示	不可执行
...003	打印	等待执行
⋮	⋮	⋮

图 10

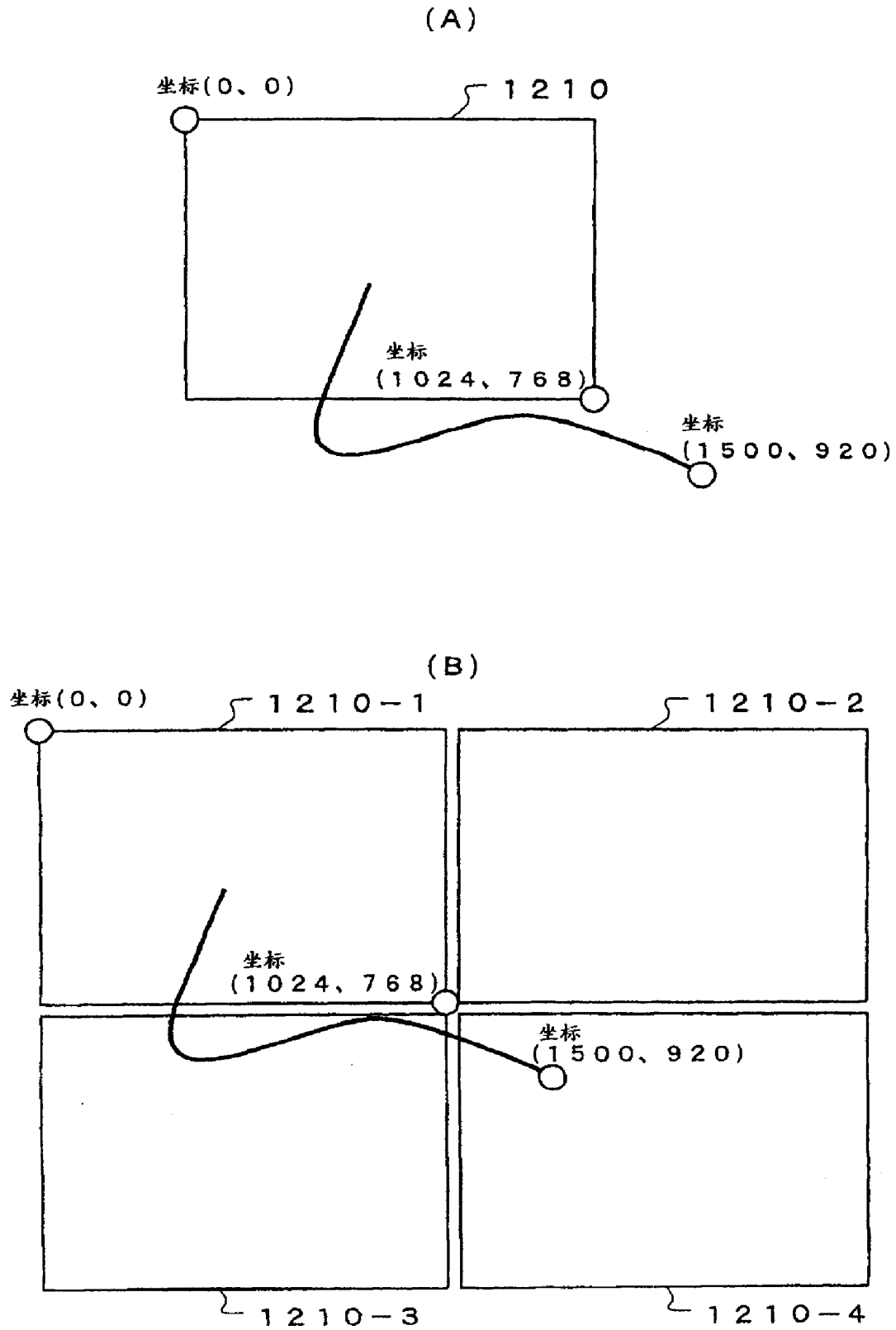


图 11

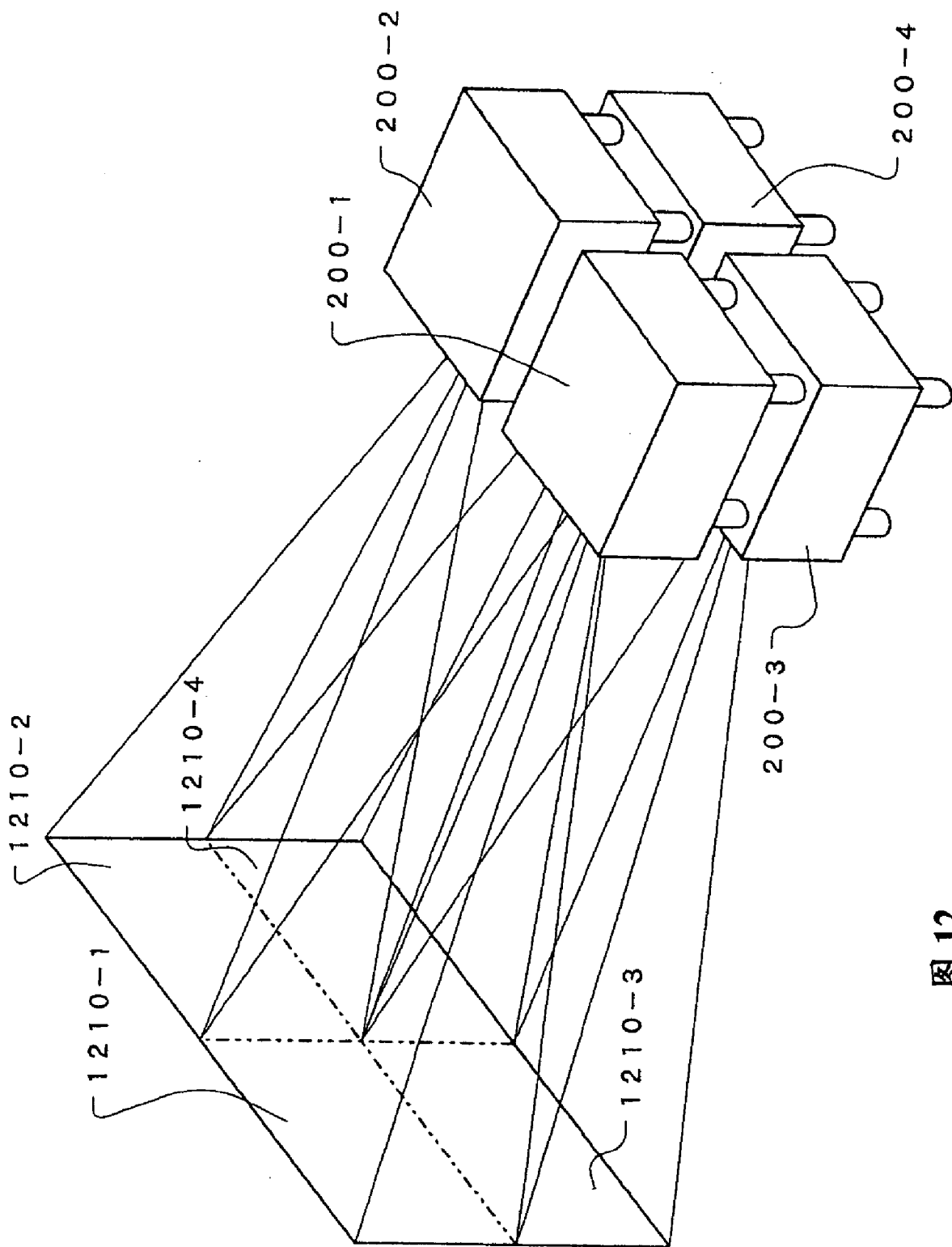


图 12

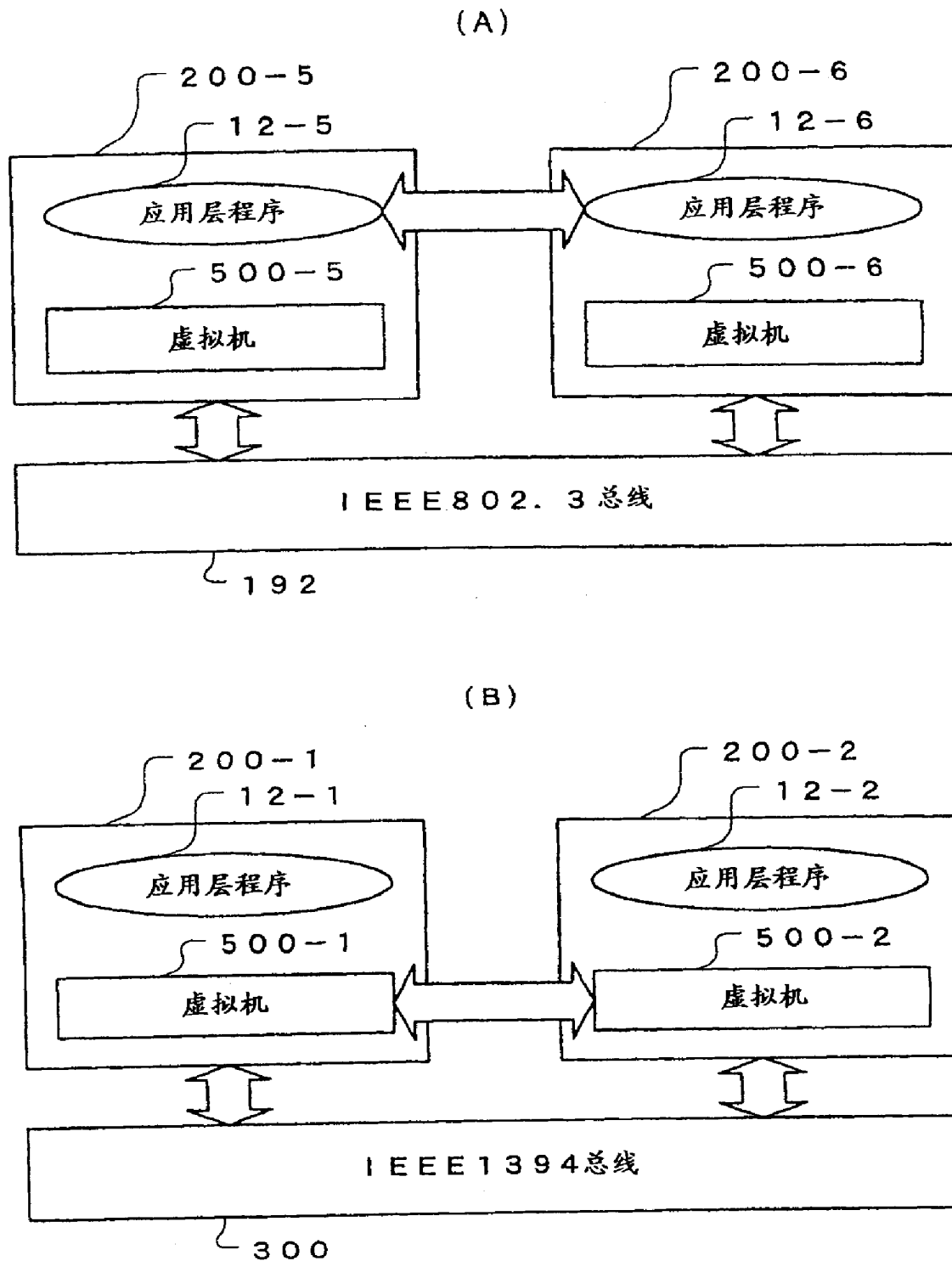


图 13

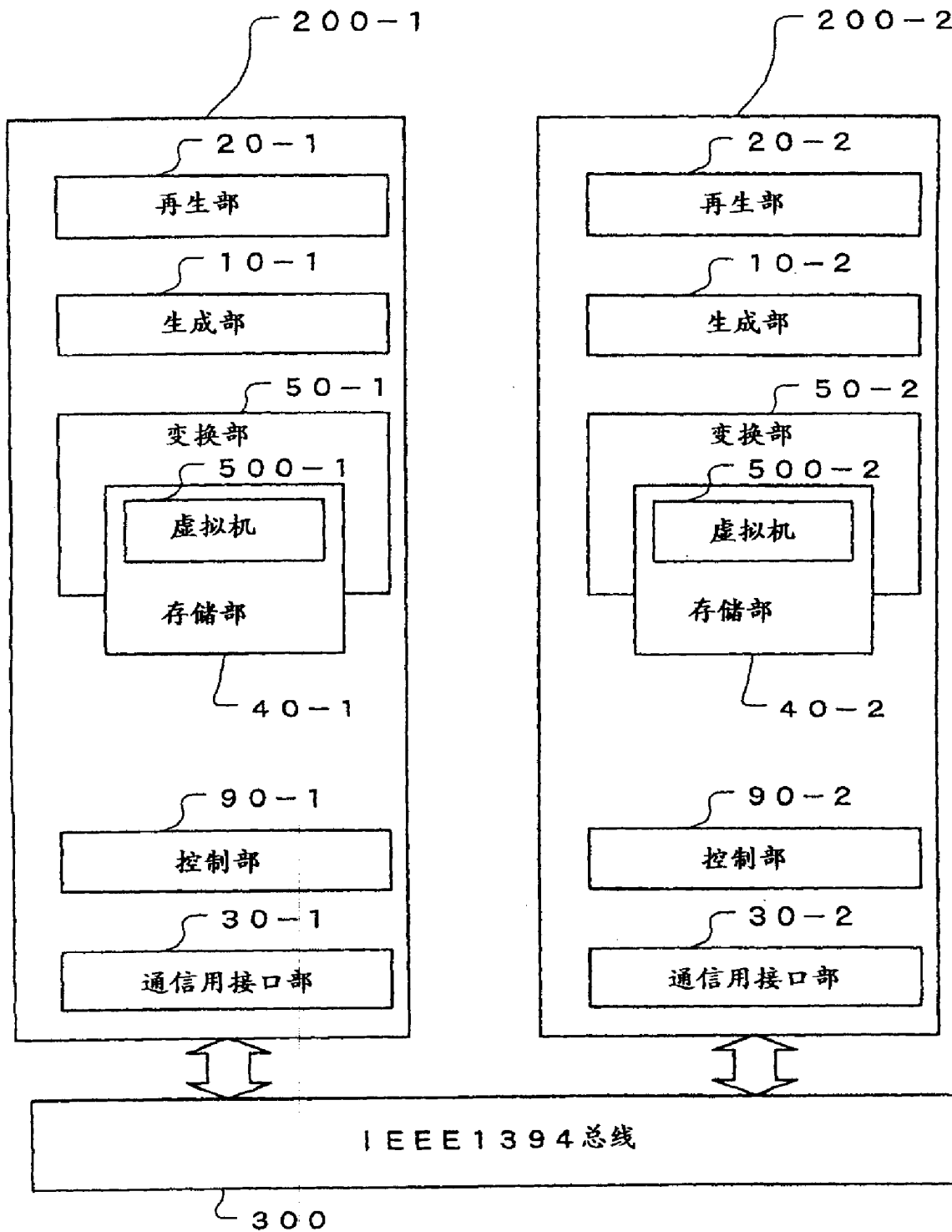


图 14

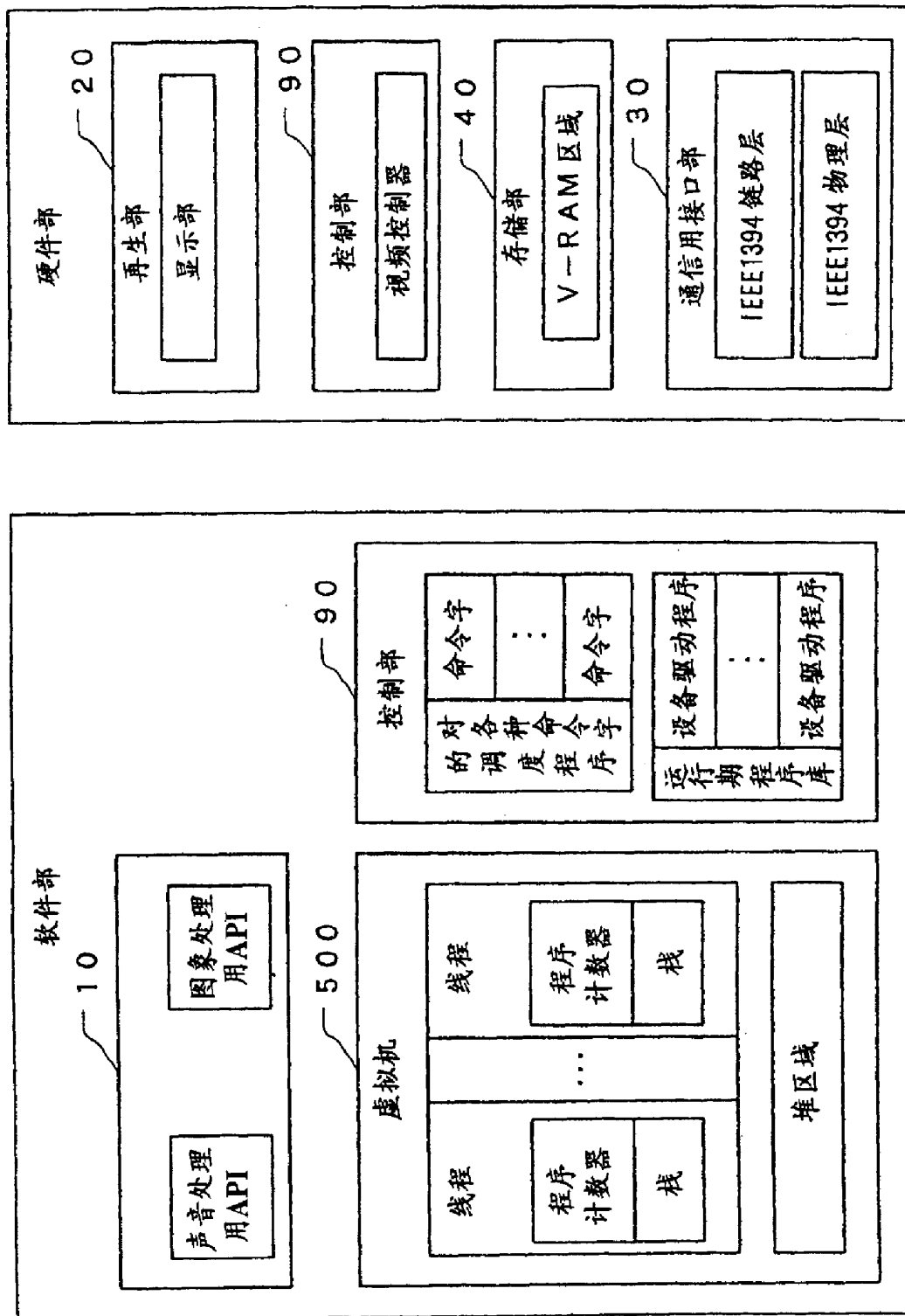


图 15



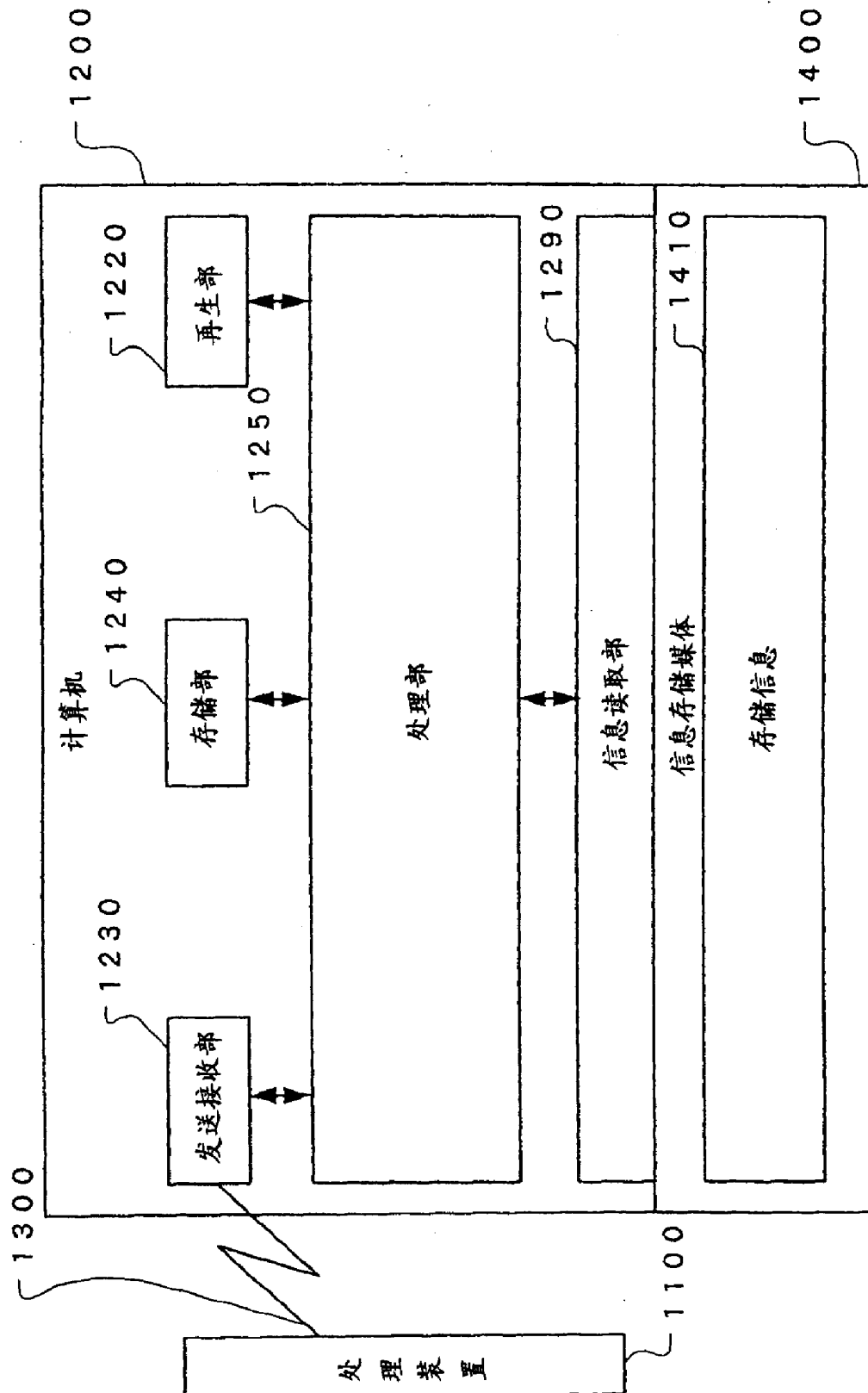


图 16

(19) 中华人民共和国国家知识产权局



## (12) 发明专利申请

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代理人 徐国文

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H04L 29/08 (2006.01)

H04N 7/15 (2006.01)

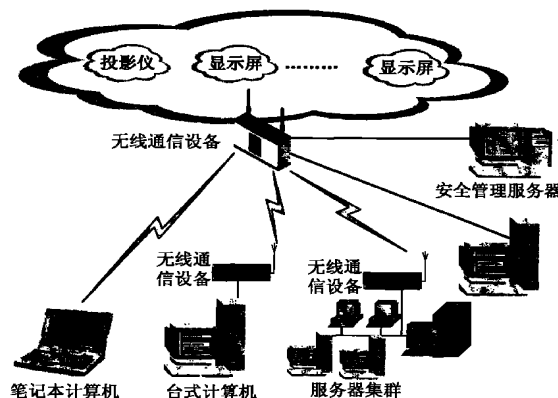
权利要求书 4 页 说明书 7 页 附图 9 页

### (54) 发明名称

一种保障安全性的电力调度云会商方法和装置

### (57) 摘要

本发明提出了一种保障安全性的电力调度云会商方法和装置,综合应用云计算、云会商、安全性、无阻塞性、高清晰视频会商及无线通信网络等技术,提供了一种保障安全性的电力调度云会商方法和装置。本发明通过随机服务排队论数学方法及 6 类优先级队列规则实现电力调度消息流事件的无阻塞性,通过集成物理防护、逻辑防护和安全管理措施实现安全性约束,通过高速通信网络实现显示 1080p (20CIF) 的高清晰视频流和幻灯图像。达到由投影仪和各类显示屏等构成的云端设备的资源共享,完成构筑保障安全性的电力调度动态云会商系统。服务于智能电网,促进智能调度全景可视化的发展。



1. 一种保障安全性的电力调度云会商方法,其特征在于包括以下步骤:

(1) 保障安全性

S2.1 物理防护:用户安全认证卡、无线设备发射功率控制、定向波束天线、用多台无线设备同频干扰器搭建防护隔离边界;

S2.2 逻辑防护:IP 地址和 MAC 地址关联认证、加密、数字签名;

S2.3 安全管理措施:监视、控制、灾备、紧急情况服务;

(2) 无阻塞

S3.1 参会人员注册登记:参加电力调度云会商的人员注册登记,包括姓名、单位、部门、职务、IP 地址、MAC 地址、提交议题及内容;

S3.2 是否有主持人,若无则 S3.3 进入发言者自助模式,若有则 S3.10 进入主持人会商模式;

S3.3 发言者自助模式;

S3.4 是否有主持人模式请求,若无则 S3.5,若有则 S3.10 进入主持人会商模式;

S3.5 优先级规则选取;

S3.6 是否有优先级规则转换,若无则 S3.7,若有则 S3.5;

S3.7 依据优先级规则确定发言者及其顺序;

S3.8 发言者使用云会商,发出高清晰会议电视流,上送至显示云端;

S3.9 是否完毕或有人要求中断,若无则 S3.7,若有则 S3.4;

S3.10 主持人会商模式;

S3.11 主持人是否宣布结束,若否则 S3.12,若是则结束;

S3.12 主持人是否指定使用,若否则 S3.13,若是则 S3.15;

S3.13 发言者申请;

S3.14 主持人确认是否认可,若否则 S3.13,若是则 S3.15;

S3.15 发言者使用云会商,发出高清晰会议电视流,上送至显示云端;

S3.16 是否完毕或有人要求中断,若无则 S3.15,若有则 S3.11;

(3) 显高清

对应会商展示每路 720p 以上质量的高清晰会议电视流,包括以下 2 步骤:

构筑 IP 网络:有线和 / 或无线传输通道构成的网络的全双工带宽不小于 33Mbps;

展示高清:包括投影仪和显示屏在内的会商展示设备支持 720p 以上质量的高清晰会议电视。

2. 如权利要求 1 所述的方法,其特征在于步骤 S3.5 优先级规则包括以下 6 类:

其一,按照参会人员注册登记的提交议题及内容,重要性由大到小,确定优先级队列;

其二,按照参会人员注册登记的申请时间顺序,利用排队论离散时间随机过程  $\{X_i\}$  所具有 Markov 性质,确定优先级队列;

其三,按照参会人员注册登记的单位序列,确定优先级队列;

其四,按照参会人员注册登记的部门专业序列,确定优先级队列;

其五,按照参会人员注册登记的职务和姓名序列,职务由大到小,同职务按照姓名字母顺序,确定优先级队列;

其六,当电力调度云会商过程中陆续有人员加入会商时,应用随机服务排队论数学方

法确定优先级队列规则为：应急事件后到先服务 (LCFS) 即 M/M/c/LCFS 模型，重要议题及内容带优先服务权 (PR) 即 M/M/c/PR 模型，次重要议题及内容随机服务 (SIRO) 即 M/M/c/SIRO 模型，剩余的一般性议题及内容集合内采用先到先服务 (FCFS) 即 M/M/c/PR 模型。

3. 如权利要求 1 或 2 所述的方法，其特征在于所述 (2) 无阻塞是根据电力调度智能化的云会商的随机服务特点，利用排队论数学方法，建立数学模型，包括：

设共有  $c$  个会商云幻灯，每个需要会商的云幻灯的平均服务率均为  $u$ ，在正常情况下，电力调度消息流事件的平均到达率为  $\lambda$ ，则  $\Delta t$  时间内有一个电力调度消息流事件到达的概率为  $P_1 = \lambda \Delta t$ ，在  $\Delta t$  时间内有一个电力调度消息流事件离去的概率为  $q_1 = \lambda \Delta t$ ；

分以下三种情况：

(1) 当无电力调度消息流事件时，三种互不相容事件的概率分别为：

(a) 在时间  $t$  内没有电力调度消息流事件排队， $\Delta t$  时刻也没有电力调度消息流事件到达的概率为  $P_0(1 - \lambda \Delta t)$ ；

(b) 在时间  $t$  内有一个电力调度消息流事件， $\Delta t$  内没有电力调度消息流事件到达，但有一位电力调度消息流事件接受云会商后离去的概率为  $P_1(1 - \lambda \Delta t)u \Delta t$ ；

(c) 在时间  $t$  内没有电力调度消息流事件排队，但在  $\Delta t$  时刻内有一位电力调度消息流事件到达，也有一位电力调度消息流事件接受云会商后离去的概率为  $P_0 \lambda \Delta t u \Delta t$ ；

则  $P_0 = P_0(1 - \lambda \Delta t) + P_1(1 - \lambda \Delta t)u \Delta t + P_0 \lambda u (\Delta t)^2$

略去二阶小量，整理得  $P_1 = \lambda P_0 / u$ ；

(2) 当已有  $n$  个电力调度消息流事件，且  $1 \leq n < c$  时，可分为以下四种情况：

(a) 时间  $t$  内有  $n-1$  个电力调度消息流事件在排队， $\Delta t$  时刻内有一位电力调度消息流事件到达，没有任何电力调度消息流事件被云会商的概率为  $P_{n-1} \lambda \Delta t (1 - nu \Delta t)$ ；

(b) 时间  $t$  内有  $n+1$  个电力调度消息流事件在排队， $\Delta t$  时刻内没有电力调度消息流事件到达，但有一位电力调度消息流事件接受云会商后离去的概率为  $P_{n+1}(1 - \lambda \Delta t)[(n+1)u \Delta t]$ ；

(c) 时间  $t$  内有  $n$  个电力调度消息流事件在排队， $\Delta t$  时刻内没有电力调度消息流事件到达，没有任何电力调度消息流事件被云会商的概率为  $P_n(1 - \lambda \Delta t)(1 - nu \Delta t)$ ；

(d) 时间  $t$  内有  $n$  个电力调度消息流事件在排队， $\Delta t$  时刻内有一个电力调度消息流事件到达，也有一位电力调度消息流事件接受云会商后离去的概率为  $P_n \lambda \Delta t nu \Delta t$ ；

(3) 电力调度消息流事件数  $n \geq c$  时，与情况 (2) 类似，但相应的概率分别为：

(a)  $P_{n-1}(\lambda \Delta t)(1 - c \mu \Delta t)$

(b)  $P_{n+1}(1 - \lambda \Delta t)(c \mu \Delta t)$

(c)  $P_n(1 - \lambda \Delta t)(1 - c \mu \Delta t)$

(d)  $P_n(\lambda \Delta t)c \mu \Delta t$

由上面的公式得到：

$$\begin{cases} P_{n-1} = \left( \frac{\lambda + c\mu}{c\mu} \right) P_n - \left( \frac{\lambda}{c\mu} \right) P_{n-1} \\ P = \frac{\left( \frac{\lambda}{\mu} \right)^n}{n!} \times P_0, \quad 1 \leq n < c \\ P_n = \frac{\left( \frac{\lambda}{\mu} \right)^n}{c! c^{n-c}} P_0, \quad n \geq c \end{cases}$$

解得系统的稳态概率为：

$$P_0 = \frac{1}{\sum_{n=0}^{c-1} \frac{\left( \frac{\lambda}{\mu} \right)^n}{n!} + \frac{\left( \frac{\lambda}{\mu} \right)^c}{c! \left( 1 - \frac{\lambda}{c\mu} \right)}}$$

只有当  $\lambda / c\mu < 1$  时,才能使会商云幻灯服务系统达到稳态而不会排成无限的队列,会商云幻灯系统的服务强度为  $\rho = \frac{\lambda}{c\mu}$ ,即会商云幻灯系统的利用率；

会商云幻灯系统的服务率为：

$$\mu_n = \begin{cases} n\mu & n=1,2,3,\dots,c \\ c\mu & n=c+1,c+2,\dots \end{cases}$$

即当系统中有  $n (n < c)$  个电力调度消息流事件时,系统的服务率为  $n\mu$ ；当系统中有  $c$  个电力调度消息流事件时,系统的服务率达到最大值  $c\mu$ ；当系统中的电力调度消息流事件数超过  $c$  时,由于  $c$  个服务台都忙着,其余电力调度消息流事件必须排队,这时的服务率仍为  $c\mu$ ；

由此可得,

$$\text{系统中的电力调度消息流事件排队长度为 } L_q = \frac{\lambda \mu \left( \frac{\lambda}{\mu} \right)^c P_0}{(c-1)!(c\mu - \lambda)^2},$$

$$\text{电力调度消息流事件在系统中的平均等候时间为 } W_q = \frac{\mu \left( \frac{\lambda}{\mu} \right)^c P_0}{(c-1)!(c\mu - \lambda)^2}$$

$$\text{电力调度消息流事件在系统中的平均逗留时间 } W_s = W_q + \frac{1}{\mu} = \frac{(c\rho)^c \rho P_0}{c!(1-\rho)^2 \lambda} + \frac{1}{\mu},$$

$$\text{系统中的平均电力调度消息流事件数 } L_s = W_s \lambda = \frac{\lambda}{\mu} + \frac{(c\rho)^c \rho P_0}{c!(1-\rho)^2},$$

其中,定义参数为：

$L_q$  :系统中的平均排队长度；

$W_q$ : 电力调度消息流事件在系统中的平均等候时间, 每个电力调度消息流事件都希望这段时间越短越好;

$W_s$ : 电力调度消息流事件在系统中的平均逗留时间;

$L_s$ : 系统中的平均电力调度消息流事件数;

$\lambda$ : 平均到达率;

$\mu$ : 平均服务率;

$c$ : 系统中并联会商云幻灯的数目;

$\rho$ : 服务强度, 即每个会商云幻灯单位时间间隔内的平均服务时间;

$P_0$ : 系统的稳态概率。

4. 一种使用权利要求 1-3 任一所述方法的装置, 其特征包括以下 8 种:

其一, 步骤保障安全性和无阻塞的实现在安全管理服务器内实现;

其二, 无线服务器支持 IEEE 802.11b/g 和 100M 局域网络接口, 带有与 720p 以上质量的投影仪 / 显示屏连接的信号接口, 并且内置 H.264 的软解压软件, 支持 DHCP 服务器功能, 可以自动为客户端电脑分配 IP 地址;

其三, 参加电力调度云会商的电脑安装云会商客户端软件, 该软件包括权利要求 1-2 的步骤和 H.264 的软编码软件;

其四, 在有线局域网应用场景, 计算机云会商群通过普通以太网交换机汇聚, 在经过以太网线连接至无线服务器, 无线服务器连接安全管理服务器和 720p 以上质量的投影仪 / 显示屏, 完成电力调度会商的显示与展现“云”化, 实现显示与展现的资源共享, 并保障其安全性;

其五, 在无线局域网应用场景, 计算机云会商群通过其内置或外置的无线局域网卡, 经过无线 IEEE 802.11b/g 协议, 连接至无线服务器, 无线服务器连接安全管理服务器和 720p 以上质量的投影仪 / 显示屏, 完成电力调度会商的显示与展现“云”化, 实现显示与展现的资源共享, 并保障其安全性;

其六, 在无线局域网和有线局域网组成的混合网应用场景, 计算机云会商群通过有线或无线局域网卡, 有线场景通过普通以太网交换机汇聚, 连接至无线服务器, 无线服务器连接安全管理服务器和 720p 以上质量的投影仪 / 显示屏, 完成电力调度会商的显示与展现“云”化, 实现显示与展现的资源共享, 并保障其安全性;

其七, 参加电力调度云会商的电脑可以是笔记本计算机、台式计算机或服务器集群;

其八, 用多台同频干扰器搭建防护隔离边界, 具体做法是: 使同频干扰器的无线覆盖半径小于无线服务器的无线覆盖半径, 在电力调度云会商会场周界外 1 个同频干扰器的无线覆盖半径的边界周围, 用多台同频干扰器搭建防护隔离边界, 相邻同频干扰器的间距为 1 个同频干扰器的无线覆盖半径。

## 一种保障安全性的电力调度云会商方法和装置

### 技术领域

[0001] 本发明属于电力领域,服务于智能电网,具体涉及电力调度智能化领域,综合云计算、云会商、安全性、无阻塞性、高清晰视频会商及无线通信网络技术,提出了一种保障安全性的电力调度云会商方法和装置。

### 背景技术

[0002] 云计算是一个比较热的新名词,资源池称为“云”,云的规模可以动态伸缩,它的边界是模糊的;云在空中飘忽不定,无法也无需确定它的具体位置,但它确实存在于某处。“云”是一些可以自我维护 and 管理的虚拟计算资源,通常为一些大型服务器集群,包括计算服务器、存储服务器、宽带资源等等。云计算将所有的计算资源集中起来,并由软件实现自动管理,无需人为参与。云计算 (Cloud Computing) 是并行计算 (Parallel Computing)、分布式计算 (Distributed Computing) 和网格计算 (Grid Computing) 的发展,或者说是这些计算机科学概念的商业实现。云计算是虚拟化 (Virtualization)、效用计算 (Utility Computing)、IaaS (基础设施即服务)、PaaS (平台即服务)、SaaS (软件即服务) 等概念混合演进并跃升的结果。当今流行的典型云计算解决方案包括 Google 云计算、Amazon 云计算、Salesforce 云计算、云安全等。

[0003] 基于自助服务的使用模型为用户提供了按需上传、构建、部署、调度、管理以及报告业务服务的能力。同时,给用户提供的自助服务越多,必要的运维管理活动就越少。基于该种云计算的理念,在电力调度会商全景可视化过程中,将显示展现“云”化,并结合安全性约束,本发明提出了一种保障安全性的电力调度云会商方法和装置。建设智能电网是国际电力工业积极应对未来挑战的共同选择,电力调度是智能电网的重要环节。在电力调度智能化的过程中,对电力调度会商的全景可视化要求越来越高。本发明的目的是实现电力调度会商的显示与展现“云”化,实现显示与展现的资源共享,并保障其安全性。

[0004] 目前的电力调度会商系统虽然有语音会商系统、视频会商系统和网真会商系统等多种形式,但存在以下 6 点不足。其一,必须在特定的会商室才能实现语音、视频或网真会商;其二,会商的显示与展现设备要么闲置、要么同时争抢使用,要实现显示与展现资源共享的需求突出;其三,若发言者需要展现个人笔记本电脑内的信息,则拔插投影仪线 / 显示屏线非常麻烦,且电脑、投影仪 / 显示屏的信号插头 / 座及其电缆易出故障,影响会商进程;其四,无法在保障安全性的前提下混合使用有线和无线会商技术;其五,无法实现发言者自助模式,而且在电力调度会商过程中陆续有人员加入的情况下更无法实现发言者自助模式;其六,无法实现在电力调度会商过程中同时兼顾 2 种模式,即发言者自助模式和主持人模式。本发明的方法和装置能够克服以上 6 点不足,其一,具有发明的装置、投影仪 / 显示屏和电脑,不强求装备齐全的会商室,在通常的会议室,即可实现保障安全性的电力调度云会商;其二,达到由投影仪和各类显示屏等构成的云端设备的资源共享;其三,电力调度云会商流通过无线或 / 和有线局域网,用局域网线与发言者电脑连接即可;其四,电力调度云会商流可以通过无线局域网或有线局域网,也以通过无线局域网和有线局域网组成的混合



网,在保障安全性的前提下实现电力调度云会商;其五,能够实现发言者自助模式,而且在电力调度会商过程中陆续有人员加入的情况下也能实现发言者自助模式;其六,能够在电力调度会商过程中同时兼顾 2 种模式,即发言者自助模式和主持人模式。

## 发明内容

[0005] 本发明借助于云计算的理念,服务于智能电网,促进智能调度全景可视化的发展,以实现显示与展现的资源共享为目标。本发明提出了云会商(Cloud Dynamic Consultation)的概念,综合应用云计算、云会商、安全性、无阻塞性、高清晰视频会商及无线通信网络等技术,提交了一种保障安全性的电力调度云会商方法和装置。并给出了本发明的具体实施方式范例——保障安全性的电力调度动态云会商系统。

[0006] 本发明通过随机服务排队论数学方法实现电力调度消息流事件的无阻塞性,通过集成加密协议和认证协议实现安全性约束,通过高速通信网络实现显示 720p(9CIF) 和 1080p(20CIF) 的高清晰视频流和幻灯图像。达到由投影仪和各类显示屏等构成的云端设备的资源共享,完成构筑保障安全性的电力调度动态云会商系统。服务于智能电网,促进智能调度全景可视化的发展。

[0007] 本发明提出的一种保障安全性的电力调度云会商方法,其特征在于包括以下步骤:

[0008] (1) 保障安全性

[0009] S2.1 物理防护:用户安全认证卡、无线设备发射功率控制、定向波束天线、用多台无线设备同频干扰器搭建防护隔离边界;

[0010] S2.2 逻辑防护:IP 地址和 MAC 地址关联认证、加密、数字签名;

[0011] S2.3 安全管理措施:监视、控制、灾备、紧急情况服务;

[0012] (2) 无阻塞

[0013] S3.1 参会人员注册登记:参加电力调度云会商的人员注册登记,包括姓名、单位、部门、职务、IP 地址、MAC 地址、提交议题及内容;

[0014] S3.2 是否有主持人,若无则 S3.3 进入发言者自助模式,若有则 S3.10 进入主持人会商模式;

[0015] S3.3 发言者自助模式;

[0016] S3.4 是否有主持人模式请求,若无则 S3.5,若有则 S3.10 进入主持人会商模式;

[0017] S3.5 优先级规则选取;

[0018] S3.6 是否有优先级规则转换,若无则 S3.7,若有则 S3.5;

[0019] S3.7 依据优先级规则确定发言者及其顺序;

[0020] S3.8 发言者使用云会商,发出高清晰会议电视流,上送至显示云端;

[0021] S3.9 是否完毕或有人要求中断,若无则 S3.7,若有则 S3.4;

[0022] S3.10 主持人会商模式;

[0023] S3.11 主持人是否宣布结束,若否则 S3.12,若是则结束;

[0024] S3.12 主持人是否指定使用,若否则 S3.13,若是则 S3.15;

[0025] S3.13 发言者申请;

[0026] S3.14 主持人确认是否认可,若否则 S3.13,若是则 S3.15;



- [0027] S3. 15 发言者使用云会商,发出高清晰会议电视流,上送至显示云端;
- [0028] S3. 16 是否完毕或有人要求中断,若无则 S3. 15,若有则 S3. 11;
- [0029] (3) 显高清
- [0030] 对应会商展示每路 720p 以上质量的高清晰会议电视流,包括以下 2 步骤:
- [0031] 构筑 IP 网络:有线和 / 或无线传输通道构成的网络的全双工带宽不小于 33Mbps;展示高清包括投影仪和显示屏在内的会商展示设备支持 720p 以上质量的高清晰会议电视;其中,步骤 S3. 5 优先级规则包括以下 6 类:
- [0032] 其一,按照参会人员注册登记的提交议题及内容,重要性由大到小,确定优先级队列;
- [0033] 其二,按照参会人员注册登记的申请时间顺序,利用排队论离散时间随机过程  $\{X_i\}$  所具有 Markov 性质,确定优先级队列;
- [0034] 其三,按照参会人员注册登记的单位序列,确定优先级队列;
- [0035] 其四,按照参会人员注册登记的部门专业序列,确定优先级队列;
- [0036] 其五,按照参会人员注册登记的职务和姓名序列,职务由大到小,同职务按照姓名字母顺序,确定优先级队列;
- [0037] 其六,当电力调度云会商过程中陆续有人员加入会商时,应用随机服务排队论数学方法确定优先级队列规则为:应急事件后到先服务 (LCFS) 即 M/M/c/LCFS 模型,重要议题及内容带优先服务权 (PR) 即 M/M/c/PR 模型,次要议题及内容随机服务 (SIRO) 即 M/M/c/SIRO 模型,剩余的一般性议题及内容集合内采用先到先服务 (FCFS) 即 M/M/c/PR 模型;
- [0038] 其中,所述 (2) 无阻塞是根据电力调度智能化的云会商的随机服务特点,利用排队论数学方法,建立数学模型,包括:
- [0039] 设共有 c 个会商云幻灯,每个需要会商的云幻灯的平均服务率均为 u,在正常情况下,电力调度消息流事件的平均到达率为  $\lambda$ ,则  $\Delta t$  时间内有一个电力调度消息流事件到达的概率为  $P_1 = \lambda \Delta t$ ,在  $\Delta t$  时间内有一个电力调度消息流事件离去的概率为  $q_1 = \lambda \Delta t$ ;
- [0040] 分以下三种情况:
- [0041] (4) 当无电力调度消息流事件时,三种互不相容事件的概率分别为:
- [0042] (a) 在时间 t 内没有电力调度消息流事件排队,  $\Delta t$  时刻也没有电力调度消息流事件到达的概率为  $P_0(1 - \lambda \Delta t)$ ;
- [0043] (b) 在时间 t 内有一个电力调度消息流事件,  $\Delta t$  内没有电力调度消息流事件到达,但有一位电力调度消息流事件接受云会商后离去的概率为  $P_1(1 - \lambda \Delta t)u \Delta t$ ;
- [0044] (c) 在时间 t 内没有电力调度消息流事件排队,但在  $\Delta t$  时刻内有一位电力调度消息流事件到达,也有一位电力调度消息流事件接受云会商后离去的概率为  $P_0 \lambda \Delta t u \Delta t$ ;
- [0045] 则  $P_0 = P_0(1 - \lambda \Delta t) + P_1(1 - \lambda \Delta t)u \Delta t + P_0 \lambda u (\Delta t)^2$
- [0046] 略去二阶小量,整理得  $P_1 = \lambda P_0 / u$ ;
- [0047] (5) 当已有 n 个电力调度消息流事件,且  $1 \leq n < c$  时,可分为以下四种情况:
- [0048] (a) 时间 t 内有 n-1 个电力调度消息流事件在排队,  $\Delta t$  时刻内有一位电力调度消息流事件到达,但没有任何电力调度消息流事件被云会商的概率为  $P_{n-1} \lambda \Delta t (1 - nu \Delta t)$ ;
- [0049] (b) 时间 t 内有 n+1 个电力调度消息流事件在排队,  $\Delta t$  时刻内没有电力调度消

息流事件到达,但有一位电力调度消息流事件接受云会商后离去的概率为  $P_{n+1}(1-\lambda \Delta t)$   $[(n+1)u \Delta t]$  ;

[0050] (c) 时间  $t$  内有  $n$  个电力调度消息流事件在排队,  $\Delta t$  时刻内没有电力调度消息流事件到达,也没有任何电力调度消息流事件被云会商的概率为  $P_n(1-\lambda \Delta t)(1-nu \Delta t)$  ;

[0051] (d) 时间  $t$  内有  $n$  个电力调度消息流事件在排队,  $\Delta t$  时刻内有一个电力调度消息流事件到达,也有一位电力调度消息流事件接受云会商后离去的概率为  $P_n \lambda \Delta t n u \Delta t$  ;

[0052] (6) 电力调度消息流事件数  $n \geq c$  时,与情况 (2) 类似,但相应的概率分别为 :

[0053] (a)  $P_{n-1}(\lambda \Delta t)(1-c\mu \Delta t)$

[0054] (b)  $P_{n+1}(1-\lambda \Delta t)(c\mu \Delta t)$

[0055] (c)  $P_n(1-\lambda \Delta t)(1-c\mu \Delta t)$

[0056] (d)  $P_n(\lambda \Delta t)c\mu \Delta t$

[0057] 由上面的公式得到 :

$$[0058] \quad \begin{cases} P_{n-1} = \left( \frac{\lambda + c\mu}{c\mu} \right) P_n - \left( \frac{\lambda}{c\mu} \right) P_{n-1} \\ P = \frac{\left( \frac{\lambda}{\mu} \right)^n}{n!} \times P_0, \quad 1 \leq n < c \\ P_n = \frac{\left( \frac{\lambda}{\mu} \right)^n}{c! c^{n-c}} P_0, \quad n \geq c \end{cases}$$

[0059] 解得系统的稳态概率为 :

$$[0060] \quad P_0 = \frac{1}{\sum_{n=0}^{c-1} \frac{\left( \frac{\lambda}{\mu} \right)^n}{n!} + \frac{\left( \frac{\lambda}{\mu} \right)^c}{c! \left( 1 - \frac{\lambda}{c\mu} \right)}}$$

[0061] 只有当  $\lambda / c\mu < 1$  时,才能使会商云幻灯服务系统达到稳态而不会排成无限的队列,会商云幻灯系统的服务强度为  $\rho = \frac{\lambda}{c\mu}$ ,即会商云幻灯系统的利用率 ;

[0062] 会商云幻灯系统的服务率为 :

$$[0063] \quad \mu_n = \begin{cases} n\mu & n=1,2,3,\dots,c \\ c\mu & n=c+1,c+2,\dots \end{cases}$$

[0064] 即当系统中有  $n(n < c)$  个电力调度消息流事件时,系统的服务率为  $n\mu$  ;当系统中有  $c$  个电力调度消息流事件时,系统的服务率达到最大值  $c\mu$  ;当系统中的电力调度消息流事件数超过  $c$  时,由于  $c$  个服务台都忙着,其余电力调度消息流事件必须排队,这时的服务率仍为  $c\mu$  ;由此可得,

[0065] 系统中的电力调度消息流事件排队长度为  $L_q = \frac{\lambda \mu \left( \frac{\lambda}{\mu} \right)^c P_0}{(c-1)!(c\mu - \lambda)^2}$ ,

[0066] 电力调度消息流事件在系统中的平均等候时间为  $W_q = \frac{\mu \left( \frac{\lambda}{\mu} \right)^c P_0}{(c-1)!(c\mu - \lambda)^2}$

[0067] 电力调度消息流事件在系统中的平均逗留时间  $W_s = W_q + \frac{1}{\mu} = \frac{(c\rho)^c \rho P_0}{c!(1-\rho)^2 \lambda} + \frac{1}{\mu}$ ,

[0068] 系统中的平均电力调度消息流事件数  $L_s = W_s \lambda = \frac{\lambda}{\mu} + \frac{(c\rho)^c \rho P_0}{c!(1-\rho)^2}$ ,

[0069] 其中,定义参数为:

[0070]  $L_q$ :系统中的平均排队长度;

[0071]  $W_q$ :电力调度消息流事件在系统中的平均等候时间,每个电力调度消息流事件都希望这段时间越短越好;

[0072]  $W_s$ :电力调度消息流事件在系统中的平均逗留时间;

[0073]  $L_s$ :系统中的平均电力调度消息流事件数;

[0074]  $\lambda$ :平均到达率;

[0075]  $\mu$ :平均服务率;

[0076]  $c$ :系统中并联会商云幻灯的数目;

[0077]  $\rho$ :服务强度,即每个会商云幻灯单位时间间隔内的平均服务时间;

[0078]  $P_0$ :系统的稳态概率。

[0079] 本发明还提出了使用上述方法的装置,其特征包括以下 8 种:

[0080] 其一,步骤保障安全性和无阻塞的实现在安全管理服务器内实现;

[0081] 其二,无线服务器支持 IEEE 802.11b/g 和 100M 局域网络接口,带有与 720p 以上质量的投影仪/显示屏连接的信号接口,并且内置 H.264 的软解压软件,支持 DHCP 服务器功能,可以自动为客户端电脑分配 IP 地址;

[0082] 其三,参加电力调度云会商的电脑安装云会商客户端软件,该软件包括权利要求 1-2 的步骤和 H.264 的软编码软件;

[0083] 其四,在有线局域网应用场景,计算机云会商群通过普通以太网交换机汇聚,在经过以太网线连接至无线服务器,无线服务器连接安全管理服务器和 720p 以上质量的投影仪/显示屏,完成电力调度会商的显示与展现“云”化,实现显示与展现的资源共享,并保障其安全性;

[0084] 其五,在无线局域网应用场景,计算机云会商群通过其内置或外置的无线局域网卡,经过无线 IEEE 802.11b/g 协议,连接至无线服务器,无线服务器连接安全管理服务器和 720p 以上质量的投影仪/显示屏,完成电力调度会商的显示与展现“云”化,实现显示与展现的资源共享,并保障其安全性;

[0085] 其六,在无线局域网和有线局域网组成的混合网应用场景,计算机云会商群通过有线或无线局域网卡,有线场景通过普通以太网交换机汇聚,连接至无线服务器,无线服务

器连接安全管理服务器和 720p 以上质量的投影仪 / 显示屏,完成电力调度会商的显示与展现“云”化,实现显示与展现的资源共享,并保障其安全性;

[0086] 其七,参加电力调度云会商的电脑可以是笔记本计算机、台式计算机或服务器集群;

[0087] 其八,用多台同频干扰器搭建防护隔离边界,具体做法是:使同频干扰器的无线覆盖半径小于无线服务器的无线覆盖半径,在电力调度云会商会场周界外 1 个同频干扰器的无线覆盖半径的边界周围,用多台同频干扰器搭建防护隔离边界,相邻同频干扰器的间距为 1 个同频干扰器的无线覆盖半径。

#### 附图说明

[0088] 为了使本发明的内容被更清楚的理解,并便于具体实施方式的描述,下面给出与本发明相关的附图说明如下:

[0089] 图 1 是本发明的装置的结构示意图;

[0090] 图 2 是本发明的云会商过程描述图;

[0091] 图 3 是本发明的云会商过程电力调度消息流事件概率特征图;

[0092] 图 4 是本发明的视频分辨率分类图;

[0093] 图 5 是本发明的视频分辨率对比图;

[0094] 图 6 是本发明的具体实施例一的装置的结构示意图;

[0095] 图 7 是本发明的具体实施例二的装置的结构示意图;

[0096] 图 8 是本发明的具体实施例三的结构示意图;

[0097] 图 9 是本发明的具体实施例四的装置的结构示意图;

[0098] 图 10 是依据本发明的方法中无阻塞步骤的流程示意图;

[0099] 图 11 是本发明的用多台同频干扰器搭建防护隔离边界的实施例图。

#### 具体实施方式

[0100] 本发明的装置实现方式图见图 1,具体说明如下。

[0101] 通过 IEEE 802.11b/g 无线通信设备构筑无线局域网,同时也可以通过网络或光缆构筑有线局域网,以星形拓扑结构的中心节点连接显示与展现云(具体云端设备包括投影仪和各类显示屏等),其他节点连接参与电力调度动态云会商的各类终端(例如笔记本计算机、台式计算机、服务器集群)。同时,安全管理服务器内置本发明的方法,通过拓扑结构中心节点管理整个电力调度动态云会商系统的安全性、无阻塞性和视频流的高清晰性,保障云端设备的资源共享。其中,计算机和服务器集群可以通过内置的无线通信网卡或外置的无线通信设备与中心节点连接,也可以通过有线局域网与中心节点连接,将电力调度消息流事件送到由投影仪和各类显示屏等构成的云端设备,进行动态的显示与展现。

[0102] 本发明可以解决的具体技术问题举例如下。

[0103] 当只有 1 台投影仪时,在会议室往往多人参加电力调度会商会议,轮流需要将自己的笔记本电脑连接到投影仪,拔插投影仪线非常麻烦。通过本发明可以非常方便地解决这一问题。图 7 是本发明的具体实施例一。无线云会商如下。在一台普通电脑上安装安全管理服务器软件,以太网线连接至无线服务器。无线服务器连接 1080p 质量的投影仪 / 显

示屏, 每台参加云会商的计算机安装云会商客户端软件, 并通过其无线局域网卡与无线服务器连接, 完成无线云会商。

[0104] 当只有 1 块可用显示屏且不使用切换矩阵的情况下, 多人参加的电力调度会商会议, 轮流需要将自己的笔记本电脑连接到显示屏, 拔插显示屏线非常麻烦。通过本发明可以非常方便地解决这一问题。图 8 是本发明的具体实施例二。

[0105] 当只有 1 台投影仪时, 会商室具备有线局域网条件, 通过本发明可以非常方便地实现投影仪共享。图 9 是本发明的具体实施例三。有线云会商如下。在一台普通电脑上安装安全管理服务器软件, 以太网线连接至无线服务器。无线服务器连接 1080p 质量的投影仪 / 显示屏, 每台参加云会商的计算机安装云会商客户端软件, 并通过其有线局域网卡经过普通以太网交换机汇聚, 连接至无线服务器, 完成有线云会商。

[0106] 当只有 1 台投影仪时, 会商室具备有线局域网条件, 部分计算机群具备支持 IEEE802.11b/g 无线局域网功能, 有线和无线可以混合使用, 通过本发明可以非常方便地实现投影仪共享。图 10 是本发明的具体实施例四。有线和无线混合网云会商如下。在一台普通电脑上安装安全管理服务器软件, 以太网线连接至无线服务器。无线服务器连接 1080p 质量的投影仪 / 显示屏, 每台参加云会商的计算机安装云会商客户端软件。有线方式通过其有线局域网卡经过普通以太网交换机汇聚, 连接至无线服务器, 完成有线云会商。无线方式通过其无线局域网卡与无线服务器连接, 完成无线云会商。

[0107] 上面通过特别的实施例内容描述了本发明, 但是本领域技术人员还可意识到变型和可选的实施例的多种可能性, 例如, 通过组合和 / 或改变单个实施例的特征。因此, 可以理解的是这些变型和可选的实施例将被认为是包括在本发明中, 本发明的范围仅仅被附上的专利权利要求书及其等同物限制。

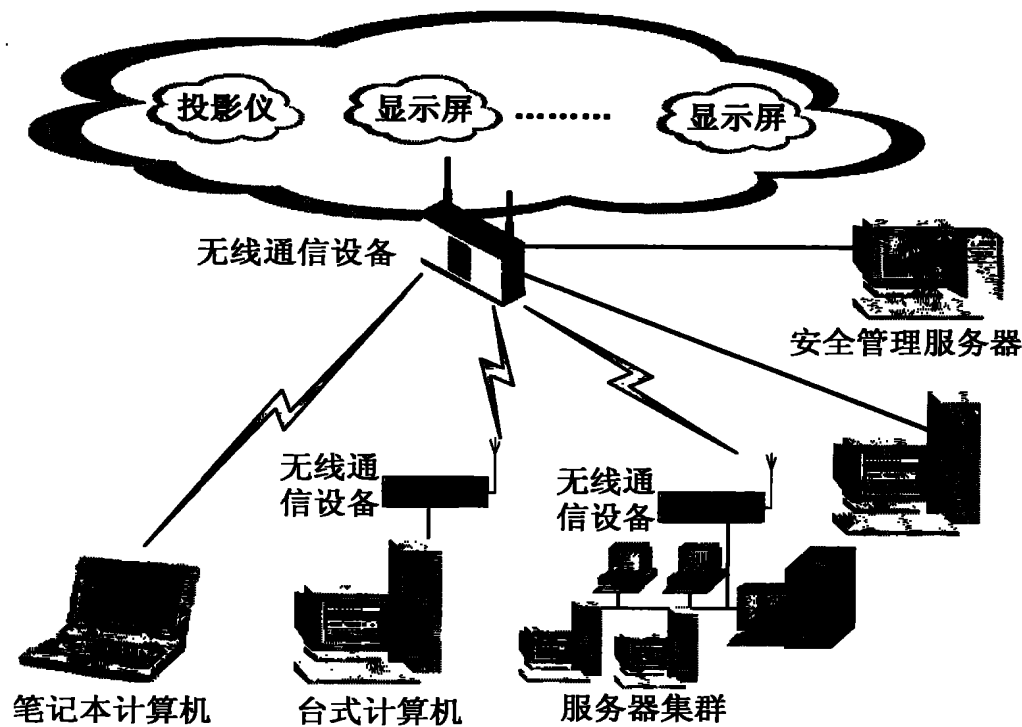


图 1

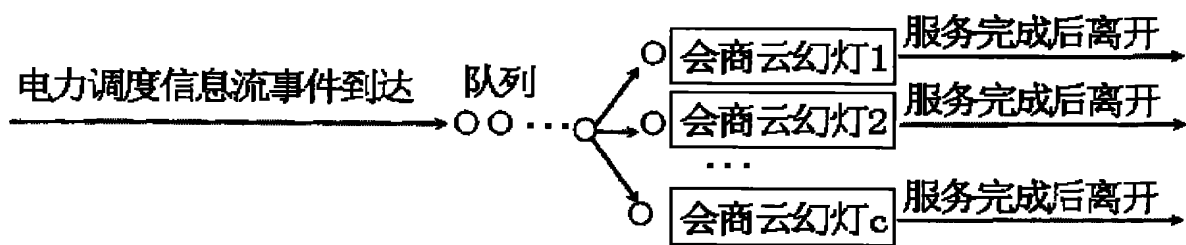


图 2

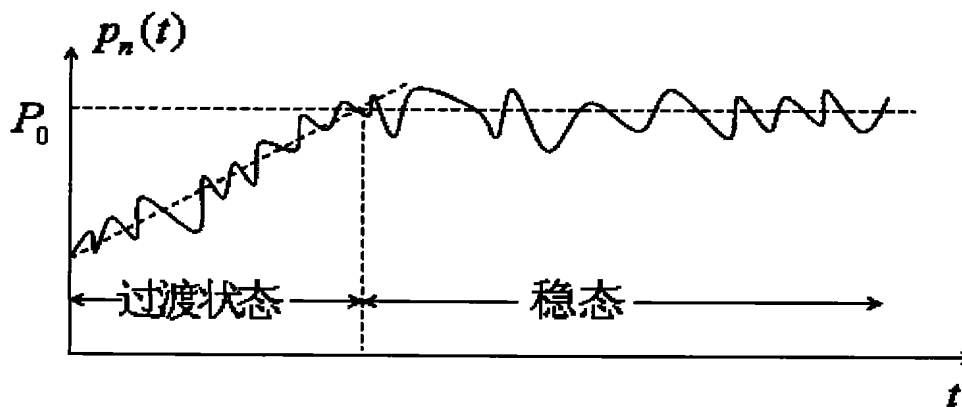


图 3

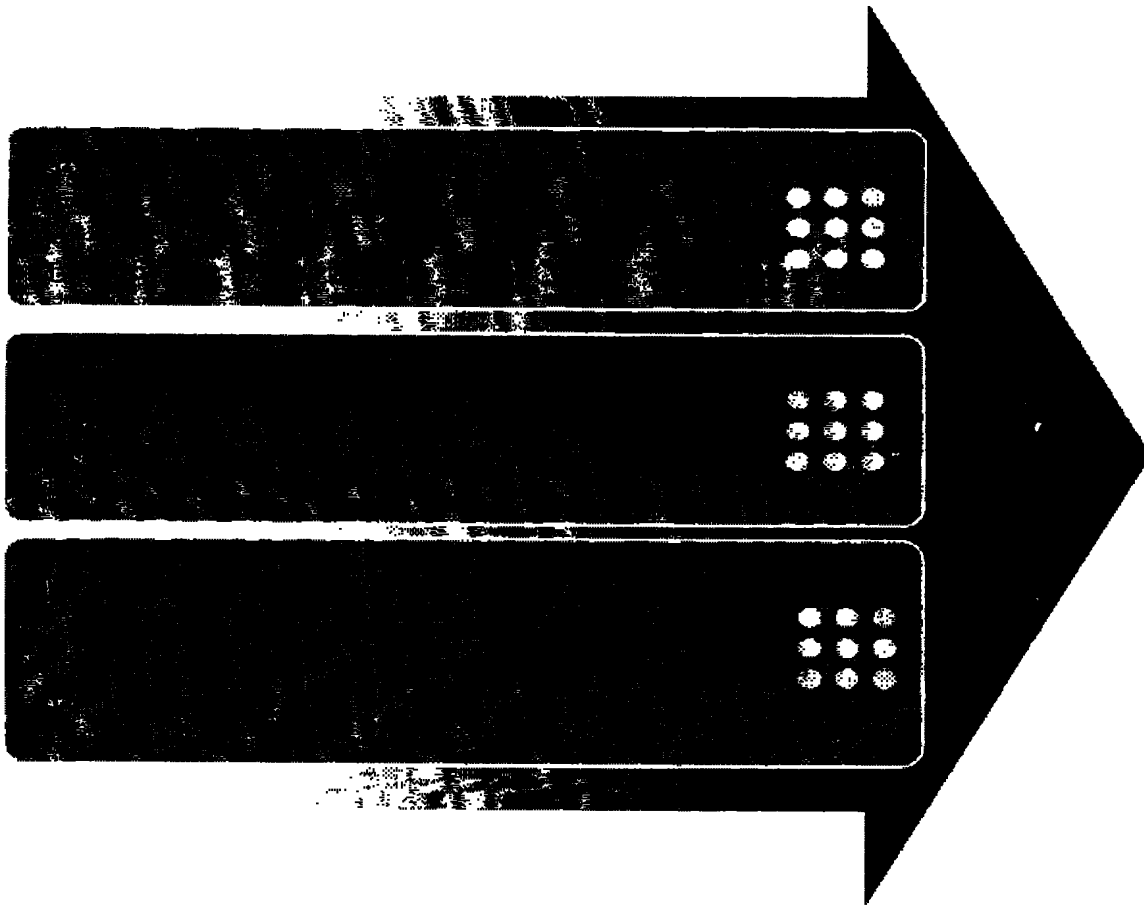


图 4



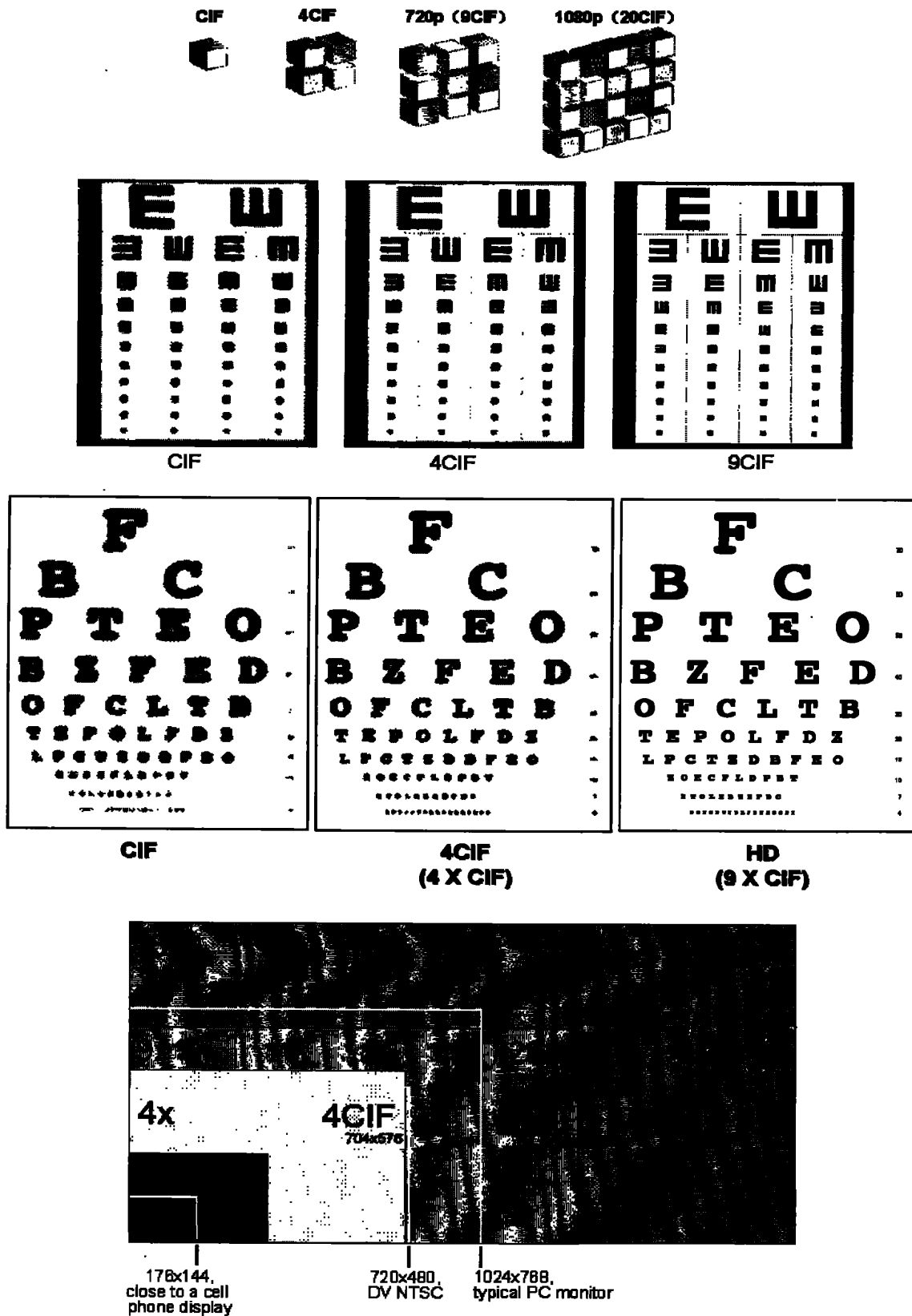


图 5





图 6

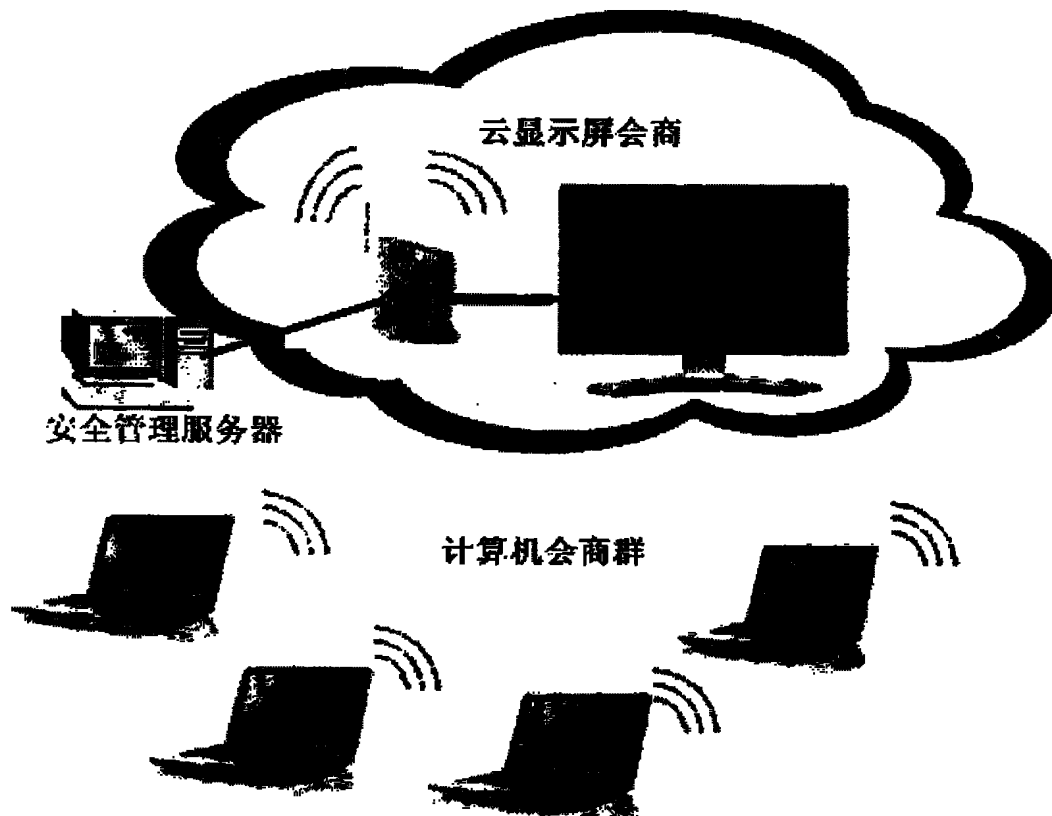


图 7

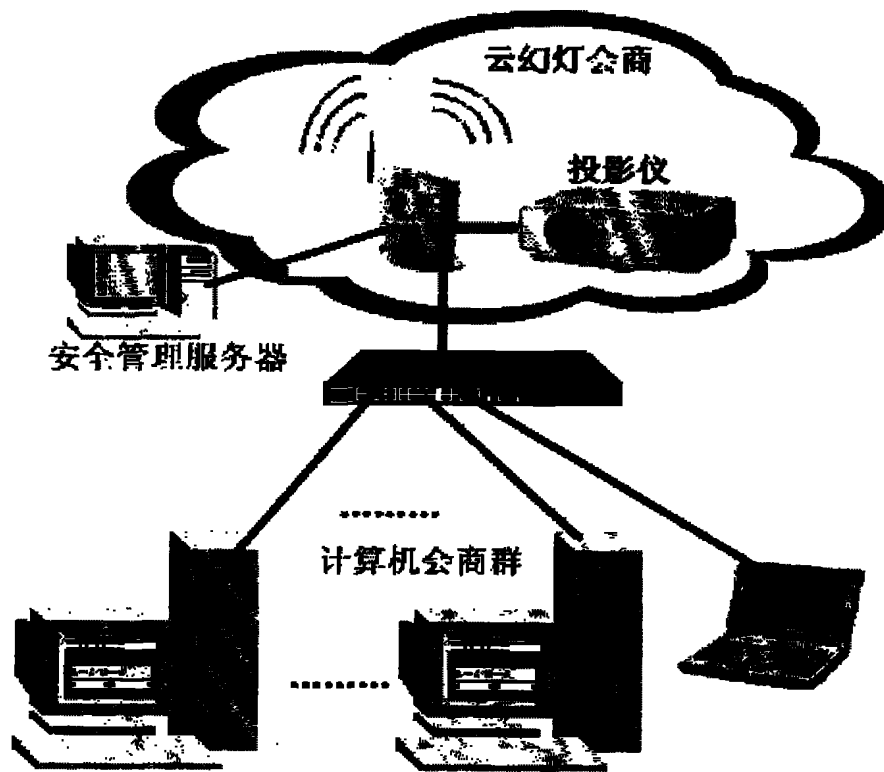


图 8

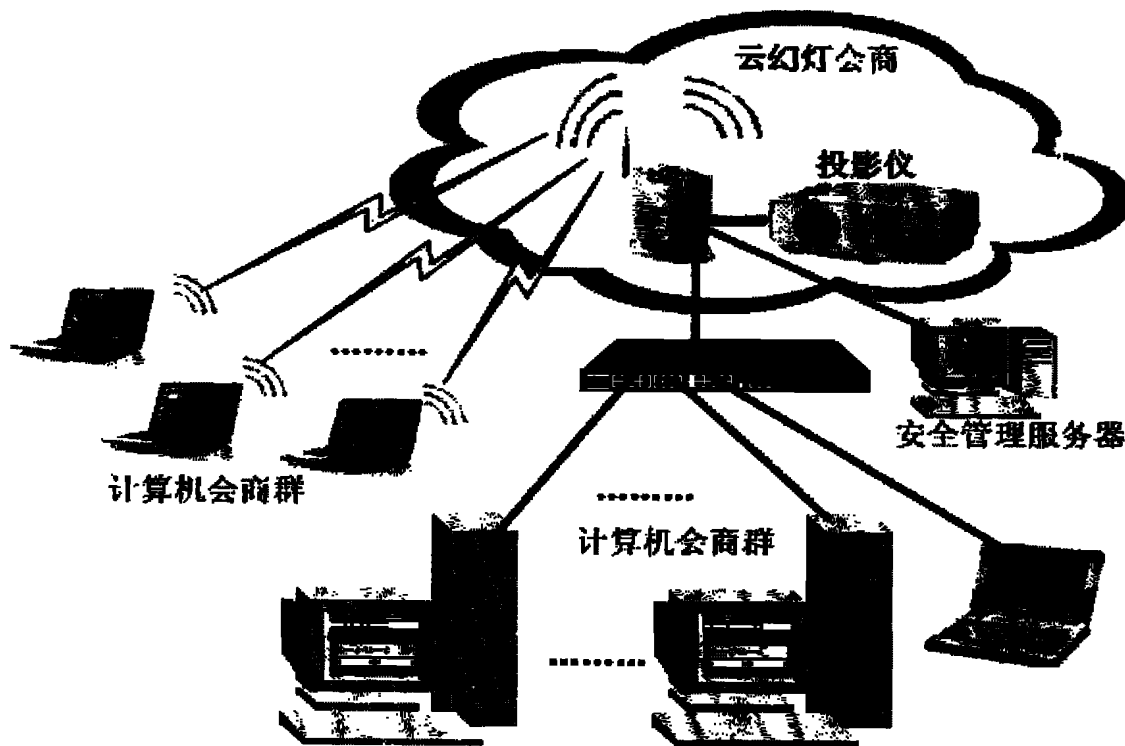


图 9

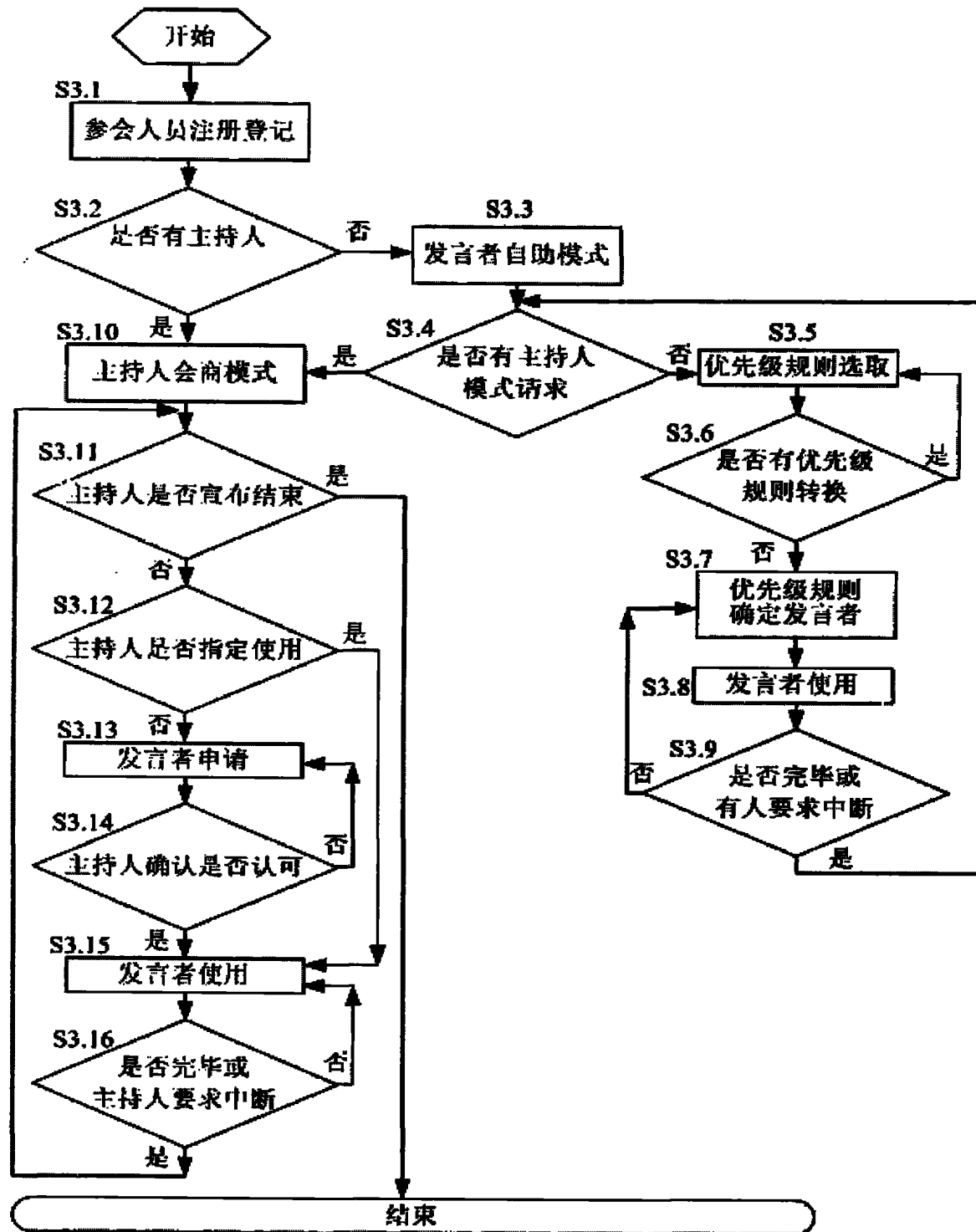


图 10



图 11

**CN101917402A Power dispatching cloud consultation method and device for guaranteeing safety**

*Data originating from sources other than the EPO may not be accurate, complete, or up to date.*

*The wording below is an initial machine translation of the original publication. To generate a version using the latest translation technology, go to the original language text and use Patent Translate.*

**Technical field**

The invention belongs to the field of electric power and serves the smart grid, and particularly relates to the field of intelligent power dispatching. It integrates cloud computing, cloud consultation, security, non-blocking, high-definition video conference and wireless communication network technology, and provides a guarantee. Method and device for safe power dispatch cloud consultation.

**Background technique**

Cloud computing is a hot new term. The resource pool is called "cloud". The scale of the cloud can be dynamically expanded and its boundaries are blurred. The cloud is erratic in the air, and it is not necessary to determine its specific location, but it does Exist somewhere. "Clouds" are virtual computing resources that can be self-maintained and managed, usually large server clusters, including computing servers, storage servers, broadband resources, and so on. Cloud computing aggregates all computing resources and is automatically managed by software without human involvement. Cloud computing is the development of parallel computing, distributed computing, and grid computing, or commercial implementation of these computer science concepts. Cloud computing is the result of a mixed evolution of concepts such as Virtualization, Utility Computing, IaaS (Infrastructure as a Service), PaaS (Platform as a Service), and SaaS (Software as a Service). Typical cloud computing solutions that are popular today include Google Cloud Computing, Amazon Cloud Computing, Salesforce Cloud Computing, Cloud Security, and more.

The self-service-based usage model provides users with the ability to upload, build, deploy, schedule, manage, and report business services on demand. At the same time, the more self-services provided to users, the fewer necessary operations and maintenance management activities. Based on this kind of cloud computing concept, during the panoramic visualization of power dispatch conferences, the display will be "cloud" and combined with security constraints, the present invention proposes a method and device for power dispatch cloud conferences that guarantee security . Building a smart grid is a common choice for the international power industry to actively respond to future challenges, and power dispatch is an important part of the smart grid. In the process of intelligent power dispatching, the requirements for panoramic visualization of power dispatching consultations are increasing. The purpose of the present invention is to achieve "cloud" display and presentation of power dispatch conferences, to realize resource sharing of display and presentation, and to ensure its security.

Although the current power dispatch consultation system has various forms such as a voice consultation system, a video consultation system, and a telepresence consultation system, it has the following six shortcomings. First, voice, video, or telepresence consultation must be implemented in a specific conference room. Second, the display and presentation equipment of the conference is either idle or used at the same time. The demand for sharing display and display resources is outstanding. Third, if the speaker needs to display the information in the personal notebook computer, it is very troublesome to plug and unplug the projector cable / display cable, and the signal plugs / stands of the computer, projector / display and their cables are prone to failure, affecting The consultation process; fourthly, the wired and wireless consultation technology cannot be mixed under the premise of ensuring security; fifthly, the speaker self-service mode cannot be realized, and it is even more important when personnel are added during the power dispatching consultation process. Speaker self-help mode cannot be realized. Sixth, it is impossible to achieve two modes, namely speaker self-help mode and moderator mode, in the process of power dispatch consultation. The method and device of the present invention can overcome the above 6 shortcomings. First, it has an invented device, a projector / display screen, and a computer. It does not require a fully equipped conference room, and security can be guaranteed in ordinary conference rooms. Power dispatch cloud consultation; second, to achieve resource sharing of cloud devices composed of projectors and various display screens; third, power dispatch cloud consultation flow through wireless or / and wired LAN, using LAN lines and speech The computer can be connected to the computer. Fourth, the power dispatch cloud conference can be implemented through wireless LAN or wired LAN, or

through a hybrid network composed of wireless LAN and wired LAN, to ensure the security of power dispatch cloud conference; Fifth, the speaker self-help mode can be realized, and speaker self-help mode can also be realized when there are people joining in the power dispatch consultation process. Sixth, it can realize both modes in the power dispatch consultation process. , Namely speaker self-service mode and moderator mode.

#### Summary of the invention

The invention uses the concept of cloud computing to serve the smart grid, promotes the development of intelligent dispatching panoramic visualization, and aims at achieving display and display resource sharing. The present invention proposes the concept of Cloud Consultation, which comprehensively applies technologies such as cloud computing, cloud consultation, security, non-blocking, high-definition video consultation, and wireless communication networks, and submits a guarantee of security Method and device for power dispatch cloud consultation. An example of a specific implementation manner of the present invention is provided—a dynamic cloud consultation system for power dispatching that guarantees security.

The invention uses the random service queuing theory mathematical method to realize non-blocking of power dispatch message flow events, integrates security protocols and authentication protocols to achieve security constraints, and realizes high-definition display of 720p (9CIF) and 1080p (20CIF) through a high-speed communication network. Video streaming and slideshow images. Achieve the resource sharing of cloud devices composed of projectors and various display screens, and complete the construction of a dynamic cloud consultation system that guarantees security. Serve the smart grid and promote the development of intelligent dispatching panoramic visualization.

The present invention provides a method for power dispatch cloud consultation to ensure security, which is characterized by including the following steps:

#### (1)Guaranteed security

S2.1 physical protection: user security certification card, wireless device transmit power control, directional beam antenna, multiple wireless devices with the same frequency jammer to establish a protective isolation boundary;

S2.2 logical protection: IP address and MAC address association authentication, encryption, digital signature;

S2.3 Security management measures: surveillance, control, disaster recovery, emergency services;

#### (2)Non-blocking

S3.1 Registration of participants: Registration of participants in the power dispatch cloud conference, including name, unit, department, position, IP address, MAC address, submission topics and content;

Whether there is a host in S3.2, if not, S3.3 enters the speaker self-service mode, if there is, then S3.10 enters the host's consultation mode;

S3.3 speaker self-help mode;

Is there a moderator mode request in S3.4? If not, then S3.5; if so, S3.10 enters the moderator mode;

S3.5 priority rule selection;

Is there a priority rule conversion in S3.6, if not, then S3.7, if there is, then S3.5;

S3.7 determine the speakers and their order according to the priority rules;

S3.8 Speakers use cloud conferences to send high-definition conference TV streams and upload them to the display cloud;

Whether S3.9 is completed or someone requested interruption; if not, S3.7; if yes, S3.4;



S3.10 Host discussion mode;

S3.11 Whether the host announces the end, if not S3.12, if so, end;

S3.12 Whether the host designated the use, if not S3.13, if so S3.15;

S3.13 Speaker application;

S3.14 The host confirms whether to approve, if not S3.13, if so S3.15;

S3.15 Speakers use cloud conferences to send high-definition conference TV streams to the display cloud;

Whether S3.16 is completed or someone requested interruption; if not, S3.15; if so, S3.11;

(3)HD

Correspondence of each conference to display high-definition conference TV streams of 720p or higher quality, including the following 2 steps:

Build an IP network: The full-duplex bandwidth of the network formed by wired and / or wireless transmission channels is not less than 33Mbps; display conference display equipment including high-definition projectors and displays support high-definition conference televisions of 720p or higher quality; Step S3.5 priority rules include the following 6 categories:

First, determine the priority queue according to the submission topics and contents of the registration of participants, from large to small;

Second, in accordance with the application time sequence of the registration of participants, the Markov property of the discrete-time random process  $\{X_i\}$  in queuing theory is used to determine the priority queue;

Third, determine the priority queue according to the sequence of units registered by the participants;

Fourth, determine the priority queue according to the department's professional sequence in which the participants are registered;

Fifth, according to the registered job title and name sequence of the participants, the duties are from large to small, and the same job is determined according to the alphabetical order of the names;

Sixth, when people join the conference one after another during the power dispatch cloud conference, the random service queuing theory mathematical method is used to determine the priority queue rule: the first-come-first-served service (LCFS) is  $M / M / c / LCFS$  Model, important issues and content with priority service rights (PR) namely  $M / M / c / PR$  model, secondary important issues and content random service (SIRO) namely  $M / M / c / SIRO$  model, remaining general issues and content The first-come-first-served (FCFS) or  $M / M / c / PR$  model is used in the collection;

Among them, the (2) non-blocking is based on the random service characteristics of intelligent cloud consultation in power dispatching, and uses the queuing theory mathematical method to establish a mathematical model, including:

Suppose there are  $c$  consultation cloud slides, and the average service rate of each cloud slide that requires consultation is  $u$ . Under normal circumstances, the average arrival rate of the power dispatch message flow event is  $\lambda$ , then there is a power dispatch in  $\Delta t$  time. The probability of a message flow event arriving is  $P1 = \lambda \Delta t$ , and the probability of a power dispatch message flow event leaving within  $\Delta t$  time is  $q1 = \lambda \Delta t$ ;

There are three cases:

(4)When no power dispatches message flow events, the probabilities of three mutually incompatible events are:

(a) There is no queue of power dispatch message flow events within time  $t$ , and the probability of no power dispatch message flow event arrival at time  $\Delta t$  is  $P0 (1-\lambda \Delta t)$ ;

(b) There is a power dispatch message flow event within time  $t$ , no power dispatch message flow event arrives within  $\Delta t$ , but the probability of a power dispatch message flow event leaving after accepting cloud consultation is  $P_1 (1-\lambda\Delta t) u\Delta t$  ;

(c) There is no queue of power dispatch message flow events at time  $t$ , but there is a probability of a power dispatch message flow event arriving at time  $\Delta t$ , and a probability of leaving a power dispatch message flow event after cloud consultation is  $P_0\lambda\Delta t u\Delta t$ ;

Then  $P_0 = P_0 (1-\lambda\Delta t) + P_1 (1-\lambda\Delta t) u\Delta t + P_0\lambda u (\Delta t)^2$

Ignore the second-order small amount, finishing  $P_1 = \lambda P_0 / u$ ;

(5) When there are  $n$  power dispatch message flow events and  $1 \leq n < c$ , it can be divided into the following four cases:

(a) There are  $n-1$  power dispatch message flow events in queue at time  $t$ , and a power dispatch message flow event arrives at time  $\Delta t$ , but the probability that no power dispatch message flow event is negotiated by the cloud is  $P_{n-1}\lambda\Delta t (1-u\Delta t)$ ;

(b) There are  $n+1$  power dispatch message flow events in queue at time  $t$ . No power dispatch message flow event arrives at time  $\Delta t$ , but the probability of a power dispatch message flow event leaving after accepting cloud consultation is  $P_{n+1} (1-\lambda\Delta t) [(n+1) u\Delta t]$ ;

(c) There are  $n$  power dispatching message flow events in queue at time  $t$ , and no power dispatching message flow event arrives at time  $\Delta t$ , nor is the probability of any power dispatching message flow event being negotiated by the cloud  $P_n (1-\lambda\Delta t) (1-u\Delta t)$ ;

(d) There are  $n$  power dispatch message flow events in the queue at time  $t$ , one power dispatch message flow event arrives at time  $\Delta t$ , and one power dispatch message flow event has the probability of leaving after accepting cloud consultations as  $P_n\lambda\Delta t u\Delta t$ ;

(6) When the number of power dispatch message flow events  $n \geq c$ , it is similar to case (2), but the corresponding probabilities are:

(a)  $P_{n-1} (\lambda\Delta t) (1-c\mu\Delta t)$

(b)  $P_{n+1} (1-\lambda\Delta t) (c\mu\Delta t)$

(c)  $P_n (1-\lambda\Delta t) (1-c\mu\Delta t)$

(d)  $P_n (\lambda\Delta t) c\mu\Delta t$

From the above formula:

The steady-state probability of the solution is:

Only when  $\lambda / c\mu \leq 1$ , can the consultation cloud slideshow service system reach a steady state without lining up in an infinite queue. The service intensity of the consultation cloud slideshow system is

, which means the utilization rate of the consultation cloud slideshow system;

The service rate of the conference cloud slideshow system is:

That is, when there are  $n$  ( $n \leq c$ ) power dispatch message flow events in the system, the service rate of the system is  $n\mu$ ; when there are  $c$  power dispatch message flow events in the system, the service rate of the system reaches the maximum value  $c\mu$ ; When the number of power dispatching message flow events in  $C$  exceeds  $c$ , because  $c$  service desks are busy, the remaining power dispatching message flow events must be queued, and the service rate at this time is still  $c\mu$ ; therefore,

The queue length of the power dispatch message flow events in the system is

The average waiting time for power dispatch message flow events in the system is

Average time of power dispatch message flow events in the system

Average number of power dispatch message flow events in the system

Among them, the defined parameters are:

$L_q$ : average queue length in the system;

$W_q$ : the average waiting time of power dispatch message flow events in the system, each power dispatch message flow event hopes that this period is as short as possible;

$W_S$ : average stay time of the power dispatch message flow event in the system;

$L_S$ : the average number of power dispatch message flow events in the system;

$\lambda$ : average arrival rate;

$\mu$ : average service rate;

$c$ : the number of parallel consultation cloud slides in the system;

$\rho$ : service intensity, that is, the average service time of each consultation cloud slide unit time interval;

$P_0$ : steady state probability of the system.

The present invention also proposes a device using the above method, which includes the following eight features:

First, the steps to ensure security and non-blocking implementation are implemented in the security management server;

Second, the wireless server supports IEEE 802.11b / g and 100M LAN interfaces, with a signal interface connected to a projector / display with a quality of 720p or higher, and a built-in H.264 soft decompression software that supports the DHCP server function. Automatically assign IP addresses to client computers;

Third, install the cloud consultation client software on the computers participating in the power dispatch cloud consultation. The software includes the steps of claims 1-2 and H.264 soft coding software;

Fourth, in the wired LAN application scenario, the computer cloud conference group is aggregated through an ordinary Ethernet switch, connected to a wireless server via an Ethernet cable, connected to a security management server and a projector / display with a quality of 720p or higher to complete power dispatch. The

display and display of conferences are "clouded" to realize the sharing of display and display resources and ensure its security;

Fifth, in the wireless LAN application scenario, the computer cloud conference group connects to the wireless server through the wireless IEEE 802.11b / g protocol through its built-in or external wireless LAN card, and the wireless server is connected to the security management server and a 720p or higher quality server. The projector / display screen completes the "cloud" display and presentation of power dispatch conferences, realizes the sharing of display and display resources, and guarantees its security;

Sixth, in a mixed network application scenario consisting of wireless LAN and wired LAN, the computer cloud conference group uses wired or wireless LAN cards, and the wired scenario is aggregated through a common Ethernet switch to connect to the wireless server. The wireless server is connected to the security management server and 720p. The projectors / display screens of the above quality can complete the "cloud" display and display of power dispatch conferences, realize the sharing of display and display resources, and ensure its security;

Seventh, the computers participating in the power dispatch cloud conference can be laptops, desktop computers, or server clusters;

Eighth, multiple co-frequency jammers are used to establish a protective isolation boundary. The specific method is to make the radio coverage radius of the co-frequency jammer smaller than the radio server's radio coverage radius, and to make a co-frequency interference outside the perimeter of the power dispatch cloud conference venue. Around the boundary of the wireless coverage radius of the device, a plurality of co-frequency interferers are used to establish a protective isolation boundary. The distance between adjacent co-frequency interferers is the radio coverage radius of a co-frequency interferer.

#### BRIEF DESCRIPTION OF THE DRAWINGS

In order to make the content of the present invention more clearly understood and to facilitate the description of specific embodiments, the accompanying drawings related to the present invention are described as follows:

FIG. 1 is a schematic structural diagram of a device of the present invention;

FIG. 2 is a diagram for describing a cloud consultation process of the present invention; FIG.

FIG. 3 is a probabilistic characteristic diagram of a power dispatch message flow event of the cloud consultation process of the present invention;

4 is a classification diagram of video resolution according to the present invention;

FIG. 5 is a video resolution comparison chart of the present invention;

6 is a schematic structural diagram of a device according to a first embodiment of the present invention;

7 is a schematic structural diagram of a device according to a second embodiment of the present invention;

8 is a schematic structural diagram of a device according to a third embodiment of the present invention;

9 is a schematic structural diagram of a device according to a fourth embodiment of the present invention;

10 is a schematic flowchart of a non-blocking step in a method according to the present invention;

FIG. 11 is a diagram of an embodiment of constructing a protective isolation boundary using multiple co-frequency interferers according to the present invention.

#### detailed description

The device implementation diagram of the present invention is shown in Fig. 1 and described in detail below.

The wireless LAN is constructed through IEEE802.11b / g wireless communication equipment, and the wired LAN can also be constructed through network cables or optical cables. The central node of the star topology is used to display and display the cloud (specific cloud devices include projectors and various display screens, etc. ), Other nodes are connected to various terminals (such as notebook computers, desktop computers, server clusters) participating in the dynamic cloud consultation of power dispatching. At the same time, the security management server embeds the method of the present invention, and manages the security, non-blocking, and high-definition of the video stream of the entire power dispatching dynamic cloud consultation system through the topology center node to ensure resource sharing of cloud devices. Among them, the computer and server cluster can be connected to the central node through the built-in wireless communication network card or external wireless communication equipment, or can be connected to the central node through the wired local area network to send power dispatch message flow events to the projector and various displays Cloud devices composed of screens, etc., for dynamic display and presentation.

Examples of specific technical problems that can be solved by the present invention are as follows.

When there is only one projector, there are often many people in the conference room to participate in the power dispatch conference. It is necessary to connect your laptop to the projector in turn, and it is very troublesome to plug and unplug the projector cable. This problem can be solved very conveniently by the present invention. FIG. 7 is a first specific embodiment of the present invention. The wireless cloud consultation is as follows. Install the security management server software on an ordinary computer and connect the Ethernet cable to the wireless server. The wireless server is connected to a 1080p-quality projector / display. Each computer participating in the cloud conference installs the cloud conference client software and connects to the wireless server through its wireless LAN card to complete the wireless cloud conference.

When there is only one display screen available and the switch matrix is not used, the power dispatch conference meeting that many people attend will need to connect their laptops to the display screen in turn, and it is very troublesome to plug in the display cable. This problem can be solved very conveniently by the present invention. FIG. 8 is a second specific embodiment of the present invention.

When there is only one projector, the conference room has the conditions of a wired local area network, and the invention can easily realize the sharing of the projectors. FIG. 9 is a third specific embodiment of the present invention. The wired cloud consultation is as follows. Install the security management server software on an ordinary computer and connect the Ethernet cable to the wireless server. The wireless server is connected to a 1080p-quality projector / display. Each computer participating in the cloud conference installs the cloud conference client software, and converges through a wired Ethernet card through a common Ethernet switch, and connects to the wireless server to complete the wired cloud conference. Business.

When there is only one projector, the conference room has the conditions of wired LAN, and some computer conference groups have the function of supporting IEEE802.11b / g wireless local area network. Wired and wireless can be used in combination. Through the invention, projector sharing can be implemented very conveniently. . FIG. 10 is a fourth specific embodiment of the present invention. The wired and wireless hybrid network cloud consultation is as follows. Install the security management server software on an ordinary computer and connect the Ethernet cable to the wireless server. The wireless server is connected to a 1080p-quality projector / display, and each computer participating in the cloud conference installs the cloud conference client software. In wired mode, the wired LAN card is used to converge through an ordinary Ethernet switch and connected to a wireless server to complete wired cloud consultation. Connect wirelessly to the wireless server through its wireless LAN card to complete wireless cloud consultation.

The invention has been described above by means of specific embodiments, but those skilled in the art will also recognize the many possibilities of variations and alternative embodiments, for example, by combining and / or changing features of a single embodiment. Therefore, it can be understood that these modifications and alternative embodiments are considered to be included in the present invention, and the scope of the present invention is limited only by the attached patent claims and their equivalents.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875				Application or Docket Number 16/852,790		Filing Date 04/20/2020		<input type="checkbox"/> To be Mailed	
ENTITY: <input checked="" type="checkbox"/> LARGE <input type="checkbox"/> SMALL <input type="checkbox"/> MICRO									
<b>APPLICATION AS FILED - PART I</b>									
		(Column 1)	(Column 2)						
FOR		NUMBER FILED	NUMBER EXTRA		RATE (\$)		FEE (\$)		
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A	N/A		N/A				
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (i), or (m))		N/A	N/A		N/A				
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A	N/A		N/A				
TOTAL CLAIMS (37 CFR 1.16(i))		minus 20 = *		x \$100 =					
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 = *		x \$460 =					
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).							
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))									
* If the difference in column 1 is less than zero, enter "0" in column 2.					TOTAL				
<b>APPLICATION AS AMENDED - PART II</b>									
		(Column 1)		(Column 2)	(Column 3)				
AMENDMENT	07/14/2021	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	x \$100 =		0	
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 4	= 0	x \$480 =		0	
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))								
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE		0	
		(Column 1)		(Column 2)	(Column 3)				
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	x \$0 =			
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x \$0 =			
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))								
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE			
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.						LIE			
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".						/FREDERICK E BRISCOE/			
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".									
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.									

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.





UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
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## NOTICE OF ALLOWANCE AND FEE(S) DUE

52835 7590 10/26/2021  
HAMRE, SCHUMANN, MUELLER & LARSON, P.C.  
45 South Seventh Street  
Suite 2700  
Minneapolis, MN 55402-1683

EXAMINER

BARTELS, CHRISTOPHER A.

ART UNIT

PAPER NUMBER

2184

DATE MAILED: 10/26/2021

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/852,790	04/20/2020	Koen Simon Herman Beel	21063.0005USC1	5321

TITLE OF INVENTION: ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$0.00	\$1200	01/26/2022

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.**

**THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.**

### HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at [www.uspto.gov/PatentMaintenanceFees](http://www.uspto.gov/PatentMaintenanceFees).**

PART B - FEE(S) TRANSMITTAL  
PageID #: 4029

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

52835 7590 10/26/2021  
HAMRE, SCHUMANN, MUELLER & LARSON, P.C.  
45 South Seventh Street  
Suite 2700  
Minneapolis, MN 55402-1683

## Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/852,790	04/20/2020	Koen Simon Herman Beel	21063.0005USC1	5321

TITLE OF INVENTION: ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$0.00	\$1200	01/26/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
BARTELS, CHRISTOPHER A.	2184	710-010000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government4a. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies \_\_\_\_\_

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☐ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. \_\_\_\_\_

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29☐ Applicant asserting small entity status. See 37 CFR 1.27☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature \_\_\_\_\_

Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_

Registration No. \_\_\_\_\_





UNITED STATES PATENT AND TRADEMARK OFFICE

PageID #: 4030

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/852,790	04/20/2020	Koen Simon Herman Beel	21063.0005USC1	5321
52835	7590	10/26/2021		
<b>HAMRE, SCHUMANN, MUELLER &amp; LARSON, P.C.</b> 45 South Seventh Street Suite 2700 Minneapolis, MN 55402-1683				
EXAMINER BARTELS, CHRISTOPHER A.				
ART UNIT			PAPER NUMBER	
2184				
DATE MAILED: 10/26/2021				

**Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)**  
 (Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

## OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

### Privacy Act Statement

**The Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulations.

<b>Notice of Allowability</b>	<b>Application No.</b> 16/852,790	<b>Applicant(s)</b> Beel et al.	
	<b>Examiner</b> CHRISTOPHER A BARTELS	<b>Art Unit</b> 2184	<b>AIA (FITF) Status</b> No

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 07/14/2021.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 82-101. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a) ☐ All      b) ☐ Some\*      c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.  
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) 2. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>See Continuation Sheet</u> . 3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material _____. 4. <input type="checkbox"/> Interview Summary (PTO-413), Paper No./Mail Date. _____.	5. <input type="checkbox"/> Examiner's Amendment/Comment 6. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance 7. <input type="checkbox"/> Other _____.
---	--

/C.A.B/ Examiner, Art Unit 2184	/HENRY TSAI/ Supervisory Patent Examiner, Art Unit 2184
------------------------------------	--

Continuation of Attachment(s) 2. Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date: 07/14/2021, 03/10/2021, 01/28/2021, 12/08/2020

Application/Control Number: 16/852,790  
Art Unit: 2184

Page 2

#### DETAILED ACTION

##### *Notice of Pre-AIA or AIA Status*

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

##### *Reasons for allowance*

2. The following is an examiner's statement of reasons for allowance:

The primary reason for allowance of the claims is the recitation of "presenting the external device to the processing device as a human interface device" **in combination with the rest of the claim is not taught by the prior art on record.** Furthermore, the Remarks filed 07/13/2021 (pages 7-8), demonstrates that the references Nuyttens and Thompson does not address the external peripheral device as a human interface device. Thus claims 82-101 are allowed.

##### *Conclusion*

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references indicate the current state of the art: US 20040012669 AND US 7450149.

##### *Contact Information*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER A. BARTELS whose telephone number is (571)270-3182. The examiner can normally be reached on Monday-Friday 9:00a-5:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Henry Tsai can be reached on 571-272-

Application/Control Number: 16/852,790  
Art Unit: 2184

Page 3

4176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/C.A.B./  
Examiner  
Art Unit 2184

/HENRY TSAI/  
Supervisory Patent Examiner, Art Unit 2184

PageID #: 4036

<b><i>Notice of References Cited</i></b>	Application/Control No. 16/852,790	Applicant(s)/Patent Under Reexamination Beel et al.	
	Examiner CHRISTOPHER A BARTELS	Art Unit 2184	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20040012669-A1	01-2004	Drell, David	G01S5/18	348/14.08
*	B	US-7450149-B2	11-2008	Drell; David	H04N7/148	348/14.08
	C					
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<b>Issue Classification</b> 	<b>Application/Control No.</b> 16/852,790	<b>Applicant(s)/Patent Under Reexamination</b> Beel et al.
	<b>Examiner</b> CHRISTOPHER A BARTELS	<b>Art Unit</b> 2184


CPC						
Symbol					Type	Version
G06F	/	13	/	102	F	2013-01-01
G06F	/	3	/	16	I	2013-01-01
G06F	/	9	/	44505	I	2013-01-01
H04L	/	12	/	1813	I	2013-01-01
H04L	/	65	/	4023	I	2013-01-01
H04L	/	65	/	4038	I	2013-01-01
H04M	/	3	/	567	I	2013-01-01

CPC Combination Sets				
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/CHRISTOPHER A BARTELS/ Examiner, Art Unit 2184 (Assistant Examiner)	09 October 2021 (Date)	<b>Total Claims Allowed:</b> 20	
/HENRY TSAI/ Supervisory Patent Examiner, Art Unit 2184 (Primary Examiner)	12 October 2021 (Date)	O.G. Print Claim(s) 82	O.G. Print Figure 11



PageID #: 4038

<b>Issue Classification</b> 	<b>Application/Control No.</b> 16/852,790	<b>Applicant(s)/Patent Under Reexamination</b> Beel et al.
	<b>Examiner</b> CHRISTOPHER A BARTELS	<b>Art Unit</b> 2184


INTERNATIONAL CLASSIFICATION					
CLAIMED					
G06F	/	13	/	10	
G06F	/	3	/	16	
G06F	/	9	/	445	
H04L	/	12	/	18	
H04L	/	29	/	06	
H04M	/	3	/	56	
NON-CLAIMED					
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US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

/CHRISTOPHER A BARTELS/ Examiner, Art Unit 2184 (Assistant Examiner)	09 October 2021 (Date)	<b>Total Claims Allowed:</b> 20	
/HENRY TSAI/ Supervisory Patent Examiner, Art Unit 2184 (Primary Examiner)	12 October 2021 (Date)	O.G. Print Claim(s) 82	O.G. Print Figure 11

PageID #: 4039


<b>Issue Classification</b> 	<b>Application/Control No.</b> 16/852,790	<b>Applicant(s)/Patent Under Reexamination</b> Beel et al.
	<b>Examiner</b> CHRISTOPHER A BARTELS	<b>Art Unit</b> 2184

☐ Claims renumbered in the same order as presented by applicant
 ☐ CPA
 ☐ T.D.
 ☐ R.1.47
**CLAIMS**

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	82	10	91	19	100										
2	83	11	92	20	101										
3	84	12	93												
4	85	13	94												
5	86	14	95												
6	87	15	96												
7	88	16	97												
8	89	17	98												
9	90	18	99												

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PageID #: 4040

<b><i>Search Notes</i></b> 	<b>Application/Control No.</b> 16/852,790	<b>Applicant(s)/Patent Under Reexamination</b> Beel et al.
	<b>Examiner</b> CHRISTOPHER A BARTELS	<b>Art Unit</b> 2184

CPC - Searched*		
Symbol	Date	Examiner

CPC Combination Sets - Searched*		
Symbol	Date	Examiner
(G06F H04L H04M and relevant subgroups) text search in East	10/01/2020	C.A.B.

US Classification - Searched*			
Class	Subclass	Date	Examiner

\* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Inventor Search in East (USPAT USOCR USGPUB)	07/2020	C.A.B.
Text search in IEEE XPlore (see handout)	10/01/2020	C.A.B.
Text search in Google Patents (see handout)	10/01/2020	C.A.B.
Text Search in East (ALL DATABASES)	09/01/2021	

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
	interference search performed in East (see handout )	09/2021-10/2021	C.A.B

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Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

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Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Christopher A. Bartels
Attorney Docket Number	BEEL3004C/TL

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Application Number	16852790
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First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Christopher A. Bartels
Attorney Docket Number	BEEL3004C/TL

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Application Number  
PageID #: 4043

16852790

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

Christopher A. Bartels

Attorney Docket Number

BEEL3004C/TL

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Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2021-01-28
Name/Print	THOMAS LEE	Registration Number	66396

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Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Christopher Bartels
Attorney Docket Number	21044.0006USC1

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/C.A.B/	1	101572794	CN		2009-11-04	SHENZHEN HUAWEI COMM TECH CO	English Abstract	
/C.A.B/	2	101917402	CN		2010-12-15	CHINA ELECTRIC POWER RES INST		×



Application Number  
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16852790

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

Christopher Bartels

Attorney Docket Number

21044.0006USC1

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/C.A.B/	4	102065267	CN		2011-05-18	LG ELECTRONICS INC	English Abstract	<input type="checkbox"/>
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Application Number  
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16852790

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

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Attorney Docket Number

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Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2021-07-14
Name/Print	THOMAS LEE	Registration Number	66396

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First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Christopher A. Bartels
Attorney Docket Number	BEEL3004C/TL

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Application Number  
PageID #: 4050

16852790

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

Christopher A. Bartels

Attorney Docket Number

BEEL3004C/TL

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

/C.A.B/	1	European Office Action in corresponding European Application No. 16207123.7, dated November 23, 2020.
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Examiner Signature	/CHRISTOPHER A BARTELS/	Date Considered	09/01/2021
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Application Number  
PageID #: 4051

16852790

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

Christopher A. Bartels

Attorney Docket Number

BEEL3004C/TL

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**OR**

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

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Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2020-12-08
Name/Print	THOMAS LEE	Registration Number	66396

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Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PageID #: 4053

PTO/SB/08a (02-18)

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# **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** ( Not for submission under 37 CFR 1.99)

Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Christopher A. Bartels
Attorney Docket Number	BEEL3004C/TL

## **U.S.PATENTS**

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Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Application Number  
PageID #: 4054

16852790

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

Christopher A. Bartels

Attorney Docket Number

BEEL3004C/TL

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

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U.S. Office Action in corresponding U.S. Application No. 16/812,755, dated February 19, 2021.

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/CHRISTOPHER A BARTELS/

Date Considered

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Application Number  
PageID #: 4055

16852790

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

Christopher A. Bartels

Attorney Docket Number

BEEL3004C/TL

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Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2021-03-10
Name/Print	THOMAS LEE	Registration Number	66396

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**Courtesy Reminder for  
Application Serial No: 16/852,790**

Attorney Docket No: 21063.0005USC1  
Customer Number: 52835  
Date of Electronic Notification: 10/26/2021

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Doc code: IDS

PageID #: 4058

PTO/SB/08a (02-18)

Doc description: Information Disclosure Statement (IDS) Filed

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	16852790
	Filing Date	2020-04-20
	First Named Inventor	BEEL
	Art Unit	2184
	Examiner Name	BARTELS
	Attorney Docket Number	21063.0005USC1

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		16852790
	Filing Date		2020-04-20
	First Named Inventor	BEEL	
	Art Unit	2184	
	Examiner Name	BARTELS	
	Attorney Docket Number	21063.0005USC1	

1	Office Action issued in Corresponding Chinese Application No. 201810229467.1, dated September 24, 2021, with English translation	×
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Name/Print	Thomas Lee	Registration Number	66396

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**Electronic Patent Application Fee Transmittal**

<b>Application Number:</b>	16852790			
<b>Filing Date:</b>	20-Apr-2020			
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS			
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel			
<b>Filer:</b>	Thomas Lee/Yanling Cottle			
<b>Attorney Docket Number:</b>	21063.0005USC1			
Filed as Large Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
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<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
SUBMISSION- INFORMATION DISCLOSURE STMT	1806	1	260	260
<b>Total in USD (\$)</b>				<b>260</b>

**Electronic Acknowledgement Receipt**

<b>EFS ID:</b>	44230474
<b>Application Number:</b>	16852790
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5321
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel
<b>Customer Number:</b>	52835
<b>Filer:</b>	Thomas Lee/Yanling Cottle
<b>Filer Authorized By:</b>	Thomas Lee
<b>Attorney Docket Number:</b>	21063.0005USC1
<b>Receipt Date:</b>	08-NOV-2021
<b>Filing Date:</b>	20-APR-2020
<b>Time Stamp:</b>	17:00:17
<b>Application Type:</b>	Utility under 35 USC 111(a)

**Payment information:**

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$260
RAM confirmation Number	E2021A8H00363869
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	IDS_0005USC1.pdf	1034321	no	4
			5363523be2f218220c90ae56a234c0d9bba7301e		
Warnings:					
Information:					
A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
2	Other Reference-Patent/App/Search documents	OA_CN.pdf	11984795	no	13
			d492756bc29f846a015136ea6e6c8003794bdbb2		
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	38080	no	2
			2ceb32bc1fd46150b5e58f579a0891dfbc7788e0		
Warnings:					
Information:					
Total Files Size (in bytes):			13057196		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/852,790	04/20/2020	Koen Simon Herman Beel	21063.0005USC1	5321

52835 7590 12/06/2021  
HAMRE, SCHUMANN, MUELLER & LARSON, P.C.  
45 South Seventh Street  
Suite 2700  
Minneapolis, MN 55402-1683

EXAMINER
----------

BARTELS, CHRISTOPHER A.

ART UNIT	PAPER NUMBER
----------	--------------

2184

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

12/06/2021

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com

<b>Corrected</b> <b>Notice of Allowability</b>	<b>Application No.</b> 16/852,790	<b>Applicant(s)</b> Beel et al.	
	<b>Examiner</b> CHRISTOPHER A BARTELS	<b>Art Unit</b> 2184	<b>AIA (FITF) Status</b> No

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 11/08/2021.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 82-101. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a) ☐ All      b) ☐ Some\*      c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.  
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. <input type="checkbox"/> Notice of References Cited (PTO-892) 2. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>11/08/2021</u> . 3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material _____. 4. <input type="checkbox"/> Interview Summary (PTO-413), Paper No./Mail Date. _____.	5. <input type="checkbox"/> Examiner's Amendment/Comment 6. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance 7. <input checked="" type="checkbox"/> Other PTO-271 Response to 312 Amendment Paper No. <u>20211124</u> .
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/C.A.B/ Examiner, Art Unit 2184	/HENRY TSAI/ Supervisory Patent Examiner, Art Unit 2184
------------------------------------	--

<b>Response to Rule 312 Communication</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	16/852,790	Beel et al.	
	<b>Examiner</b>	<b>Art Unit</b>	<b>AIA (FITF) Status</b>
	CHRISTOPHER A BARTELS	2184	No

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

1. ☒ The amendment filed on 08 November 2021 under 37 CFR 1.312 has been considered, and has been:

a) ☒ entered.

b) ☒ entered as directed to matters of form not affecting the scope of the invention.

c) ☐ disapproved because the amendment was filed after the payment of the issue fee.  
Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue.

d) ☐ disapproved. See explanation below.

e) ☐ entered in part. See explanation below.

No claim listing was attached to the 11/08/2021, only an NPL and Information Disclosure statement

/C.A.B/ Examiner, Art Unit 2184	/HENRY TSAI/ Supervisory Patent Examiner, Art Unit 2184
------------------------------------	--



Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PageID #: 4070

PTO/SB/08a (02-18)

Approved for use through 11/30/2020. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

# **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** ( Not for submission under 37 CFR 1.99)

Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	BEEL
Art Unit	2184
Examiner Name	BARTELS
Attorney Docket Number	21063.0005USC1

## **U.S.PATENTS**

Remove

Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2i</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
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## **NON-PATENT LITERATURE DOCUMENTS**

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>

Application Number  
PageID #: 4071

16852790

Filing Date

2020-04-20

First Named Inventor

BEEL

Art Unit

2184

Examiner Name

BARTELS

Attorney Docket Number

21063.0005USC1

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

/C.A.B/	1	Office Action issued in Corresponding Chinese Application No. 201810229467.1, dated September 24, 2021, with English translation	×
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If you wish to add additional non-patent literature document citation information please click the Add button

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**EXAMINER SIGNATURE**

Examiner Signature	/CHRISTOPHER A BARTELS/	Date Considered	11/16/2021
--------------------	-------------------------	-----------------	------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

Application Number  
PageID #: 4072

16852790

Filing Date

2020-04-20

First Named Inventor

BEEL

Art Unit

2184

Examiner Name

BARTELS

Attorney Docket Number

21063.0005USC1

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2021-11-08
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

**Privacy Act Statement**

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PART B - FEES TRANSMITTAL  
PageID #: 4074

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

52835 7590 10/26/2021  
HAMRE, SCHUMANN, MUELLER & LARSON, P.C.  
45 South Seventh Street  
Suite 2700  
Minneapolis, MN 55402-1683

## Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

Yanling Cottle	(Typed or printed name)
/yanling cottle/	(Signature)
January 25, 2022	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/852,790	04/20/2020	Koen Simon Herman Beel	21063.0005USC1	5321

TITLE OF INVENTION: ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1200	\$0.00	\$0.00	\$1200	01/26/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
BARTELS, CHRISTOPHER A.	2184	710-010000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 HAMRE, SCHUMANN,  
MUELLER & LARSON, P.C.

2

3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

BARCO N.V.

Kortrijk Belgium

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☒ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 503478

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29☐ Applicant asserting small entity status. See 37 CFR 1.27☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Thomas Lee/

Date January 25, 2022

Typed or printed name Thomas Lee

Registration No. 66396

Electronic Patent Application Fee Transmittal				
<b>Application Number:</b>		16852790		
<b>Filing Date:</b>		20-Apr-2020		
<b>Title of Invention:</b>		ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		
<b>First Named Inventor/Applicant Name:</b>		Koen Simon Herman Beel		
<b>Filer:</b>		Thomas Lee/Yanling Cottle		
<b>Attorney Docket Number:</b>		21063.0005USC1		
Filed as Large Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
UTILITY APPL ISSUE FEE	1501	1	1200	1200

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1200

**Electronic Acknowledgement Receipt**

<b>EFS ID:</b>	44832240
<b>Application Number:</b>	16852790
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5321
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel
<b>Customer Number:</b>	52835
<b>Filer:</b>	Thomas Lee/Yanling Cottle
<b>Filer Authorized By:</b>	Thomas Lee
<b>Attorney Docket Number:</b>	21063.0005USC1
<b>Receipt Date:</b>	25-JAN-2022
<b>Filing Date:</b>	20-APR-2020
<b>Time Stamp:</b>	17:41:38
<b>Application Type:</b>	Utility under 35 USC 111(a)

**Payment information:**

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 1200
RAM confirmation Number	E20221OH41552384
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:



**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	IF_0005USC1_.pdf	1819552	no	1
			0ec9b2dff6654a8866c0a06b12884996a042e63f		

**Warnings:**

**Information:**

2	Fee Worksheet (SB06)	fee-info.pdf	38045	no	2
			0f59270d221423bd41e7da3b8d4988f4a1af0a46		

**Warnings:**

**Information:**

<b>Total Files Size (in bytes):</b>			1857597
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**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/852,790	04/20/2020	Koen Simon Herman Beel	21063.0005USC1	5321
52835	7590	02/15/2022		
HAMRE, SCHUMANN, MUELLER & LARSON, P.C. 45 South Seventh Street Suite 2700 Minneapolis, MN 55402-1683			EXAMINER BARTELS, CHRISTOPHER A.	
			ART UNIT	PAPER NUMBER
			2184	
			NOTIFICATION DATE	DELIVERY MODE
			02/15/2022	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com

<b>Corrected</b> <b>Notice of Allowability</b>	<b>Application No.</b> 16/852,790	<b>Applicant(s)</b> Beel, Koen Simon Herman	
	<b>Examiner</b> CHRISTOPHER A BARTELS	<b>Art Unit</b> 2184	<b>AIA (FITF) Status</b> No

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**  
 All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 01/12/2022.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are 82-101. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a) ☐ All      b) ☐ Some\*      c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.  
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. <input type="checkbox"/> Notice of References Cited (PTO-892) 2. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>04/07/2021, 04/21/2021, 05/28/2021</u> . 3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material _____. 4. <input type="checkbox"/> Interview Summary (PTO-413), Paper No./Mail Date. _____.	5. <input type="checkbox"/> Examiner's Amendment/Comment 6. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance 7. <input type="checkbox"/> Other _____.
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/C.A.B/ Examiner, Art Unit 2184	/HENRY TSAI/ Supervisory Patent Examiner, Art Unit 2184
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APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR/ PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
16/852,790	04/20/2020	Beel et al.	21063.0005USC1

<b>HAMRE, SCHUMANN, MUELLER &amp; LARSON, P.C.</b> <b>45 South Seventh Street Suite 2700</b> <b>Minneapolis, MN 55402-1683</b>		EXAMINER	
		CHRISTOPHER A BARTELS	
		ART UNIT	PAPER
		2184	20220208

DATE MAILED: \_\_\_\_\_

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The references cited in the following IDS 04/7/2021, 04/21/2021 and 05/28/2021 do not materially affect patentability. Thus, prosecution remains closed.

/C.A.B/  
Examiner, Art Unit 2184

/HENRY TSAI/  
Supervisory Patent Examiner, Art Unit 2184

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PageID #: 4082

PTO/SB/08a (02-18)

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( Not for submission under 37 CFR 1.99)

Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Christopher A. Bartels
Attorney Docket Number	BEEL3004C/TL

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/C.A.B/	1	20110222556	A1	2011-09-15	Shefler et al.	

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Application Number  
PageID #: 4083

16852790

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

Christopher A. Bartels

Attorney Docket Number

BEEL3004C/TL

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/C.A.B/	1	European Office Action in corresponding European Application No. 12775162.6, dated April 19, 2021.
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Application Number  
PageID #: 4084

16852790

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

Christopher A. Bartels

Attorney Docket Number

BEEL3004C/TL

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STATEMENT BY APPLICANT**  
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See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2021-04-21
Name/Print	THOMAS LEE	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PageID #: 4086

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Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Christopher A. Bartels
Attorney Docket Number	BEEL3004C/TL

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/C.A.B./	1	20100079783	A1	2010-04-01	Naganuma et al.	

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Application Number  
PageID #: 4087

16852790

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

Christopher A. Bartels

Attorney Docket Number

BEEL3004C/TL

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European Search Search in corresponding European Application No. 20212054.9, dated April 7, 2021.

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/CHRISTOPHER A BARTELS/

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Application Number  
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16852790

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

Christopher A. Bartels

Attorney Docket Number

BEEL3004C/TL

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

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Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2021-04-07
Name/Print	THOMAS LEE	Registration Number	66396

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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Doc description: Information Disclosure Statement (IDS) Filed

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STATEMENT BY APPLICANT**  
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Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	Christopher A. Bartels
Attorney Docket Number	BEEL3004C/TJM

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Application Number  
PageID #: 4091

16852790

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

Christopher A. Bartels

Attorney Docket Number

BEEL3004C/TJM

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STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

/C.A.B./1

Summons To Attend Oral Proceedings in corresponding European Application No. 12762258.7, dated May 20, 2021.

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Application Number  
PageID #: 4092

16852790

Filing Date

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Signature	/Thomas J. Moore/	Date (YYYY-MM-DD)	2021-05-28
Name/Print	THOMAS J. MOORE	Registration Number	28974

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/852,790	03/22/2022	11281598	21063.0005USC1	5321

52835 7590 03/02/2022

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.  
45 South Seventh Street  
Suite 2700  
Minneapolis, MN 55402-1683

## ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

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**INVENTOR(s)** (Please see PAIR WEB site <http://pair.uspto.gov> for additional inventors):

Koen Simon Herman Beel, Eke, BELGIUM;  
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**APPLICANT(s)** (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

BARCO N.V., Kortrijk, BELGIUM;

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	16852790
	Filing Date	2020-04-20
	First Named Inventor	BEEL
	Art Unit	2184
	Examiner Name	BARTELS
	Attorney Docket Number	21063.0005USC1

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	Filing Date		2020-04-20	
	First Named Inventor	BEEL		
	Art Unit	2184		
	Examiner Name	BARTELS		
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4	101542459	CN	A	2009-09-23		With English machine translation	<input checked="" type="checkbox"/>
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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>
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Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-03-17
Name/Print	Thomas Lee	Registration Number	66396

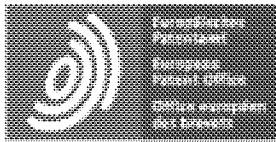
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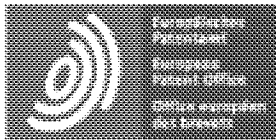
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## ABSTRACT JP2004112638A

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<sup>13</sup> PROBLEM TO BE SOLVED: To provide a conference recording method, an apparatus and a program capable of efficiently recording a conference situation as conference information and effectively using the recorded conference information. SOLUTION: An image taken by a camera 2, a material displayed on a projector 4, an image written on an electronic whiteboard 5 and the like are distributed to a client 6 as conference information, and conference information to be recorded based on the viewing rate is distributed. At the same time, when an event such as a statement or writing to the electronic whiteboard 5 occurs in the conference, the event is detected and the conference information corresponding to the event is selected and recorded for a certain period of time. [Selection diagram] Fig. 1



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### DESCRIPTION JP2004112638A

<sup>10</sup> Meeting recording method and equipment and program

[]

<sup>14</sup> The present invention relates to a conference recording method, an apparatus, and a program, and more particularly to a conference recording method, an apparatus, and a program, which records conference information such as a video of a conference situation in chronological order. ... In recent years, as a method other than saving the minutes of a meeting or the like as a document, the video or audio of the meeting has been recorded and saved. Some techniques for recording the video and audio of a meeting not only record and save the video taken by the camera, but also guarantee that the recording is authentic (for example, patent documents). 1). On the other hand, as a technique for recording a highly useful image when there are a plurality of cameras or the like for photographing, the technique described in the specification of Japanese Patent Application No. 2001-287740 filed by the applicant of the present application is used. be. This technology acquires the selected state of each video when selecting an arbitrary part of a plurality of videos or one video and distributing it as one video that can be viewed, and based on this selected state, each video The audience rating is calculated, and a plurality of images are sequentially rearranged and edited based on the calculated audience rating to generate an image for recording. Japanese Patent Application Laid-Open No. 2001-309366 [0005] [Problems to be Solved by the Invention] However, the technique described in the specification of Japanese Patent Application Laid-Open No. 2001-287740 is applied to the record of the conference. If you try, the image quality may deteriorate because the presentation materials displayed on the projector or large display and the information written on the whiteboard will be shot and recorded once with the camera. Be done. Therefore, an object of the present invention is to provide a conference recording method, an apparatus, and a program capable of efficiently recording the conference situation as conference information and effectively using the recorded conference information. [Means for Solving the Problems] In order to achieve the above-mentioned object, the invention of

claim 1 is selected in a conference recording method for recording a plurality of conference information including at least an image of a conference situation. A plurality of conference participants are allowed to view a possible conference information group, and the audience rate of each conference information of the conference information group is calculated based on the selection by each of the plurality of conference participants, and the calculated audience rate is used. Based on this, one conference information is selected from the conference information group and recorded, and when a predetermined event occurs in the conference, the conference information corresponding to the event is recorded among the conference information of the conference information group. It is characterized by selecting and recording for a certain period of time.

48 Further, in the invention of claim 2, the event is a remark by a conference participant of the conference, and the conference information obtained by photographing the conference participant who made the remark is constant. It is characterized by selecting a time and recording. Further, in the invention of claim 3, the event is the designation of the conference information by the administrator who manages the conference, and is designated by the administrator from the conference information group. It is characterized in that the conference information is selected and recorded for a certain period of time. Further, in the invention of claim 4, the conference information group includes electronic data of the presentation material presented at the conference, and the event is the presentation content of the presentation material. It is characterized by the change of. Further, in the invention of claim 5, the conference information group includes electronic data of an image written on an electronic whiteboard used in the conference, and the event is described in the event. It is characterized by executing writing to the electronic whiteboard. The invention of claim 6 is characterized in that, in the invention of claim 1, the conference information selected from the conference information group is recorded in association with each conference information of the conference information group. The invention according to claim 7 is a conference recording device for recording a plurality of conference information including at least an image of a conference situation, and a conference that distributes a selectable conference information group to a plurality of conference participants. The information distribution means, the selection information acquisition means for acquiring the selection information of the conference information selected by the conference participant among the conference information of the conference information group distributed by the conference information distribution means, and the selection information acquisition means. Based on the acquired selection information, the audience rate calculation means for calculating the audience rate of each conference information in the conference information group, the event detection means for detecting a predetermined event in the conference, and the audience rate calculation means calculated. When one conference information is selected and recorded from the conference information group based on the viewing rate and the event detecting means detects the event, the event among the conference information of the conference information group is described. It is characterized by providing a conference information recording means for selecting and recording conference information corresponding to the above for a certain period of time. Further, in the invention of claim 8, the event detecting means detects the



remarks made by the conference participants of the conference as the event, and the conference information recording means is the preceding. It is characterized in that conference information obtained by photographing a conference participant who made a statement detected by the event detection means is selected and recorded for a certain period of time.

85 Further, in the invention of claim 9, the event detecting means detects the designation of the conference information by the administrator who manages the conference as the event, and records the conference information. The means is characterized in that conference information designated by the administrator from the conference information group is selected and recorded for a certain period of time. Further, in the invention of claim 10, the conference information group includes electronic data of the presentation material presented at the conference, and the event detecting means is the presentation material of the presentation material. The conference record information recording means detects a change in the presentation content as the event, and is characterized in that electronic data of the presentation material is selected and recorded for a certain period of time. Further, in the invention of claim 11, the conference information group includes electronic data of an image written on an electronic whiteboard used in the conference, and the event detection means. Detects the execution of writing on the electronic whiteboard as the event, and the conference information recording means selects and records the electronic data of the image written on the electronic whiteboard for a certain period of time. .. Further, in the invention of claim 12, the conference information recording means records the conference information selected from the conference information group in association with each conference information of the conference information group. It is characterized by that. Further, the invention of claim 13 is a conference recording program in which a computer executes recording of a plurality of conference information including at least a video of a conference situation, and a plurality of conference participants can select a conference information group. The selection information acquisition step for acquiring the selection information of the conference information selected by the conference participant among the conference information of the conference information group distributed in the conference information distribution step and the conference information distribution step, and the selection. A viewing rate calculation step that calculates the viewing rate of each conference information of the conference information group based on the selection information acquired in the information acquisition step, an event detection step that detects a predetermined event in the conference, and the viewing rate calculation. One conference information is selected from the conference information group based on the viewing rate calculated in the step and recorded, and when the event is detected in the event detection step, the conference information of each conference information group is recorded. Among them, it is characterized by including a conference information recording step of selecting and recording conference information corresponding to the event for a certain period of time. Further, in the invention of claim 14, the event detection step detects the remarks made by the conference participants of the conference as the event, and the conference information recording step is the preceding. It is characterized in that conference information obtained by photographing a conference participant who made

a statement detected in the event detection step is selected and recorded for a certain period of time.

- 124 Further, in the invention of claim 15, in the invention of claim 13, the event detection step detects the designation of the conference information by the administrator who manages the conference as the event, and records the conference information. The step is characterized in that the conference information designated by the administrator from the conference information group is selected and recorded for a certain period of time. Further, in the invention of claim 16, in the invention of claim 13, the conference information group includes electronic data of the presentation material presented at the conference, and the event detection step is the presentation material. The change in the presentation content is detected as the event, and the conference information recording step is characterized in that electronic data of the presentation material is selected and recorded for a certain period of time. Further, in the invention of claim 17, the conference information group includes electronic data of an image written on an electronic whiteboard used in the conference, and the event detection step. Detects the execution of writing on the electronic whiteboard as the event, and the conference information recording step is characterized in that electronic data of an image written on the electronic whiteboard is selected and recorded for a certain period of time. .. Further, in the invention of claim 18, the conference information recording step records the conference information selected from the conference information group in association with each conference information of the conference information group. It is characterized by that. Hereinafter, an embodiment of a conference recording method and apparatus and a program according to the present invention will be described in detail with reference to the accompanying drawings. FIG. 1 is a block diagram showing a schematic configuration of a conference recording system to which the present invention is applied. As shown in the figure, the conference recording system includes a conference recording device 1, a camera 2, a microphone 3, a projector 4, an electronic whiteboard 5, and a client 6. The conference recording device 1 records the status of the conference as conference information such as video and audio. The camera 2 captures the situation of the conference and outputs it as an image, and usually, a plurality of cameras 2 are used. The microphone 3 acquires voice in a conference and outputs it as voice information, and usually, a plurality of microphones 3 are used. The projector 4 displays presentation materials and the like presented at a conference. Since the conference recording device 1 acquires presentation materials in the form of electronic data or video signals, the projector 4 may actually be used as a computer device for projector control (also used as a client 6). ).
- 156 Further, the projector 4 can be replaced with a large display. Furthermore, when a conference is held between remote locations, there may be multiple projectors 4, but even in this case, the same presentation material will be presented to all projectors 4, so that material will be used. It becomes one. The electronic whiteboard 5 is a whiteboard or an equivalent thereof, and is capable of writing arbitrary characters and images and outputting the written images in the form of electronic data. Further, when a conference is held between remote locations, a plurality of electronic whiteboards 5 may be used. In this case, when writing is performed on one electronic whiteboard 5, another electronic whiteboard 5 is used. Use a whiteboard 5

with specifications that display the written contents. The client 6 is a computer device used by the participants of the conference, and is equipped with a browser for viewing conference information such as video delivered from the conference recording device 1. Further, when the client 6 presents the presentation material to the projector 4 or when the client 6 writes to the electronic whiteboard 5, the corresponding software is required. The conference information recording DB 7 is a database that records the conference information acquired by the conference recording device 1 and the edited conference information. The conference information recorded here includes the video signal of the video captured by the camera 2, the audio signal of the audio acquired by the microphone 3, the video signal acquired from the projector 4, the application data of the material, and the electronic whiteboard 5. There are the obtained video signals and the edited results obtained by editing these with the conference recording device 1. The conference information recording DB 7 stores at least the edited result edited by the conference recording device 1. The conference recording device 1, the camera 2, the microphone 3, the projector 4, the electronic whiteboard 5, and the client 6 may be connected by a network such as LAN, WAN, or the Internet, and are not necessarily connected to one conference room. Not everything needs to be placed. Next, the details of the conference recording device 1 will be described. FIG. 2 is a block diagram showing a functional configuration of the conference recording device 1. The conference recording device 1 can be configured by a computer device, and in that case, each part shown in FIG. 2 is configured by software.

184 As shown in the figure, the conference recording device 1 includes a conference information acquisition unit 11, a conference information distribution unit 12, a selection information acquisition unit 13, a viewing rate calculation unit 14, an event detection unit 15, and a conference information editing unit 16. , The conference information storage unit 17 is provided. The conference information acquisition unit 11 acquires video signals, audio signals, and the like as conference information from the camera 2, the microphone 3, the projector 4, and the electronic whiteboard 5. The conference information distribution unit 12 distributes the conference information acquired by the conference information acquisition unit 11 to the client 6 in a format that can be viewed by a browser. Further, if necessary, for example, when the video is distributed to a projector or the like installed in a conference room or the like, in addition to the conference information acquired by the conference information acquisition unit 11, these are edited by the conference information editing unit 16. The edited result is also delivered. The conference information delivered to the client 6 is displayed on the browser, for example, as shown in the screen 60 shown in FIG. The image 61, the image 62, the image 63, the image 64, the image 65, and the image 66 are displayed on the screen 60. The video 61 is an enlarged display of a video selected by a conference participant who operates the browser from any of the video 62, the video 63, the video 64, the video 65, and the video 66. Further, for example, the image 62, the image 63, and the image 64 are images taken by the camera 2, the image 65 is an image of the presentation material displayed on the projector 4, and the image 66 is written on the electronic whiteboard 5. It is a video of the image. In this way, the conference information distribution unit 12 distributes the conference information so that the conference participants can pay

attention to and browse the desired conference information on the client 6. Further, at this time, the sound acquired by the microphone 3 is synthesized or appropriately selected and distributed together with the video. The selection information acquisition unit 13 acquires selection information of the conference information selected by the conference participants in each client 6. The acquired selection information is notified to the conference information distribution unit 12, and is used for distribution of the conference information displayed as a video 61 by the conference information distribution unit 12. Further, this selection information is also notified to the audience rating calculation unit 14. The audience rating calculation unit 14 calculates the audience rating of each conference information based on the selection information acquired from each client 6 by the selection information acquisition unit 13. The event detection unit 11 detects an event that has occurred in the conference. The events to be detected include the remarks of the conference participants based on the voice information acquired by the microphone 3, the switching of the materials presented on the projector 4 (page change, etc.), and the writing on the electronic whiteboard 5. It is detected from the conference information acquired by the conference information acquisition unit 11.

222 In addition to this, as an event, there is a meeting information selection by a meeting manager such as a chairman. This is the case when the conference information in which the decision items in the conference are displayed is selected before the end of the conference, and this event is acquired from the client 6 used by the conference administrator. The conference information editing unit 16 edits the conference information acquired by the conference information acquisition unit 11 in chronological order. In this editing, the audience rating calculated by the audience rating calculation unit 14 and the occurrence of the event detected by the event detection unit 15 are used. For example, normally, the conference information is edited based on the audience rating calculated by the audience rating calculation unit 14, and when the event detection unit 15 detects the occurrence of an event, the conference information corresponding to the event is input for a certain period of time. select. Various methods can be considered for editing conference information based on the audience rating, and one of them is a method of selecting the one having the highest audience rating from a plurality of conference information. In this method, the conference information with the highest audience rating is always selected in conjunction with the ever-changing audience rating, and the conference information of the edited result is obtained by connecting these in chronological order. As another method, a method of calculating the audience rating ratio for a certain period of time and selecting each of the conference information in chronological order according to the audience rating ratio, or usually selecting specific conference information. This is a method of selecting conference information and connecting them in chronological order when there is conference information that exceeds a predetermined audience rating. Further, when an event occurs, the conference information corresponding to the event is inserted for a certain period of time from the occurrence of the event. For example, when the speech by the conference participant is detected as an event from the voice information by the microphone 3, the image (conference information) of the conference participant taken by the corresponding camera 2 is selected and the material

presented to the projector 4 is displayed. When switching or writing to the electronic whiteboard 5, the conference information acquired from the projector 4 and the conference information acquired from the electronic whiteboard 5 are selected, respectively. In addition, when a meeting manager such as a chairman selects predetermined meeting information, for example, when selecting meeting information in which decisions made at the meeting are displayed, by selecting this, the edited version can be selected. The meeting information will include the display of decisions made at the meeting. Although a plurality of methods for editing the conference information are shown here, when actually recording the conference information, the method for editing is set in the conference recording device 1 in advance. It will be.

258 The conference information storage unit 17 stores the conference information edited by the conference information editing unit 16 in the conference information recording DB 7. At this time, each of the conference information acquired by the conference information acquisition unit 11 can be saved together, and when these are saved, the edited conference information and the respective conference information before editing are linked. Equally associate and save. Next, the flow of the conference information editing process in the conference recording device 1 will be described. FIG. 4 is a flowchart showing the flow of the conference information editing process of the conference recording device 1. When the conference recording device 1 starts the operation, the conference information editing unit 16 calculates the audience rating among the plurality of conference information acquired from each unit until the end instruction is given (NO in step 101). The conference information determined based on the audience rating calculated by the unit 14 is selected as the conference information for normal use (step 102). Here, when the event detection unit 15 detects the occurrence of an event (YES in step 103), the conference information editing unit 16 selects the conference information corresponding to the generated event (step 104), and the conference information is set for a certain period of time. Wait for the progress (NO in step 105). Then, when a certain time elapses (YES in step 105), the conference information determined based on the audience rating calculated by the audience rating calculation unit 14 for normal use is selected again (step 102). After that, when an end instruction is input from the administrator or the like (YES in step 101), the conference recording device 1 ends the editing process of the conference information. Next, an application example of the conference recording system including the conference recording device 1 will be described. FIG. 5 is a diagram showing a configuration example of a conference recording system when recording a conference in one conference room. As shown in the figure, a plurality of cameras 2 (2-1 to 2-3), a plurality of microphones 3 (3-1 to 3-3), a projector 4, and an electronic whiteboard are housed in the conference room. 5. A plurality of clients 6 (6-1 to 6-7) and a projector 8 are arranged. Although the conference recording device 1 is not shown in the figure, it is actually connected to the conference recording device 1 to perform processing such as distribution, editing, and recording of conference information. In this configuration, the camera 2-1 and the microphone 3-1 correspond, the camera 2-2 and the microphone 3-2, and the camera 2-3 and the microphone 3-3 correspond to each other, for example, taking a picture of the camera 2-1. The range and the voice acquisition range of the



microphone 3-1 almost match. Further, each client 6 displays a browser screen as shown in FIG. 3, and the operator of each client 6 can select desired conference information.

292 Further, in this configuration, the conference recording device 1 does not need to deliver (record) audio. A presentation material is displayed on the projector 4, and the display of this material can be switched by, for example, an operation of the client 6-4. Arbitrary writing is possible on the electronic whiteboard 5. Further, the projector 8 displays the conference information captured by each of the cameras 2 and the conference information selected based on the audience rating among the conference information in an enlarged manner. When a conference is held with this configuration, it is normally displayed on A, B, C, which is the conference information captured by each of the cameras 2, and D, which is the conference information displayed on the projector 4, and the electronic whiteboard 5. Each of the conference information E is appropriately selected and recorded based on the audience rating. When an event occurs in this state, for example, when a participant operating the client 6-2 makes a statement, the voice is acquired by the microphone 3-1 and the camera 2-1 takes a picture accordingly. A, which is the conference information, is selected and recorded for a certain period of time. Further, when the participant who operates the client 6-4 switches the material to be displayed on the projector 4, the conference information displayed on the projector 4 is selected and recorded for a certain period of time. Further, when another participant writes on the electronic whiteboard 5, the conference information displayed on the electronic whiteboard 5 is selected and recorded for a certain period of time. Further, at the end of the conference, for example, when the operator of the client 6-1 who is the chairman selects the conference information to be displayed on the electronic whiteboard 5 from the browser in a compulsory sense, the electronic whiteboard is accompanied by the selection. If the conference information displayed on the board 5 is selected and recorded for a certain period of time and the decision items in the conference are displayed on the electronic whiteboard 5, this will be recorded. FIG. 6 is a diagram showing a configuration example of a conference recording system in the case of recording a remote conference in which a plurality of conference rooms are connected by a network. As shown in the figure, a camera 2-4, a microphone 3-4, a projector 4-1 and an electronic whiteboard 5-1 and a client 6-8 are arranged in the conference room 201, and the conference room 202 is arranged. The camera 2-5 and the microphone 3-5, the projector 4-2, the electronic whiteboard 5-2, the client 6-9 and the like are arranged in the conference room 203, and the camera 2-6 and the microphone 3-6 are arranged in the conference room 203. A projector 4-3, an electronic whiteboard 5-3, a client 6-10, and the like are arranged.

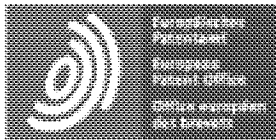
325 Then, these are connected to each other via the network 210. Although not shown in the figure, the conference recording device 1 is actually connected to the network 210 to perform processing such as distribution, editing, and recording of conference information. In this configuration, the camera 2-4 and the microphone 3-4, the camera 2-5 and the microphone 3-5, and the camera 2-6 and the microphone 3-6 correspond to each other. Further, a browser screen as shown in FIG. 3 is displayed on each client 6 (including those without a reference numeral), and the operator of each client 6 can select desired conference

information. It is possible. Further, in this configuration, the conference recording device 1 also distributes audio. A material for presentation is displayed on each projector 4 (4-1 to 4-3). This material is displayed by, for example, an operation of a client 6-8, and is displayed by the projector 4 -1, The same material is displayed on all of Projector 4-2 and Projector 4-3. Further, arbitrary writing is possible on each of the electronic whiteboard 5-1 and the electronic whiteboard 5-2 and the electronic whiteboard 5-3, and the written contents are shared by the three parties. For example, when writing to the electronic whiteboard 5-1 is performed, the written contents are also displayed on the electronic whiteboard 5-2 and the electronic whiteboard 5-3. When a conference is held with this configuration, it is normally displayed on A, B, C, which is the conference information captured by each of the cameras 2, and D, which is the conference information displayed on the projector 4, and the electronic whiteboard 5. Each of the conference information E is appropriately selected and recorded based on the audience rating. When an event occurs in this state, for example, when a participant operating the client 6-10 makes a statement, the voice is acquired by the microphone 3-6, and the camera 2-6 takes a picture accordingly. C, which is the conference information, is selected and recorded for a certain period of time. Further, when the participant who operates the client 6-8 switches the material to be displayed on the projector 4-1, the conference information (projector 4-2, projector 4-3) displayed on the projector 4-1 is accompanied by the switching. The same conference information is also displayed) is selected and recorded for a certain period of time. Further, when another participant writes on the electronic whiteboard 5-1, the conference information displayed on the electronic whiteboard 5-1 is selected and recorded for a certain period of time.

354 Further, at the end of the meeting, for example, when the operator of the client 6-9, who is the chairman, selects the meeting information to be displayed on the electronic whiteboard 5-2 from the browser in a compulsory sense, the operation thereof is accompanied by this. If the conference information displayed on the electronic whiteboard 5-2 is selected and recorded for a certain period of time and the decision items at the conference are displayed on the electronic whiteboard 5-2, this will be recorded. The configuration of the conference system using the conference recording device 1 is not limited to the example described here, and can be appropriately changed according to the scale of the conference, the venue, and the like. With such a configuration, the contents of the conference can be easily confirmed by referring to the conference information edited and recorded by the conference recording device 1 instead of the minutes. Further, when the conference information before editing is associated and recorded together with the conference information edited by the conference recording device 1, it is possible to confirm the detailed information in the conference. Further, by using the technology and the like shown in Patent Document 1 together, it is possible to use the conference information as a guaranteed conference record. [Effects of the Invention] As described above, according to the present invention, images taken by a camera, materials displayed on a projector, images written on an electronic whiteboard, and the like are distributed as conference information, and the conference information is distributed. The conference information to be recorded is selected based on the viewing rate, and when an event occurs in the conference, the conference information corresponding to the event is

selected and recorded for a certain period of time, so an editor is required. The meeting information can be recorded appropriately, and the edited meeting information can be referred to instead of the minutes. BRIEF DESCRIPTION OF THE DRAWINGS FIG. 1 is a block diagram showing a schematic configuration of a conference recording system to which the present invention is applied. FIG. 2 is a block diagram showing a functional configuration of the conference recording device 1. FIG. 3 is a diagram showing an example of a display screen by a browser on the client 6. FIG. 4 is a flowchart showing a flow of a conference information editing process of the conference recording device 1. FIG. 5 is a diagram showing a configuration example of a conference recording system when recording a conference in one conference room. FIG. 6 is a diagram showing a configuration example of a conference recording system in the case of recording a remote conference in which a plurality of conference rooms are connected by a network. [Explanation of codes] 1 Conference recording device 2, 2-1 to 2-6 Camera 3, 3-1 to 3-6 Mike 4, 4-1 to 4-3 Projector 5, 5-1 to 5-3 Electronic white Board 6, 6-1 to 6-10, client 7, conference information recording DB8, projector 11, conference information acquisition unit 12, conference information distribution unit 13, selection information acquisition unit 14, audience rate calculation unit 15, event detection unit 16, conference information editing unit 17, and conference information storage. Part 60 Screen 61 Video 62 Video 63 Video 64 Video 65 Video 66 Video 201 Meeting Room 202 Meeting Room 203 Meeting Room 210 Network





# Patent Translate

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## CLAIMS JP2004112638A

1.

<sup>13</sup> In a conference recording method for recording a plurality of conference information including at least a video of a conference situation, a group of selectable conference information is allowed to be viewed by a plurality of conference participants, and the selection by each of the plurality of conference participants is performed. Based on this, the viewing rate of each meeting information in the meeting information group is calculated, and one meeting information is selected and recorded from the meeting information group based on the calculated viewing rate, and a predetermined event occurs in the meeting. In this case, a conference recording method characterized in that, among the conference information of the conference information group, the conference information corresponding to the event is selected and recorded for a certain period of time.

2.

<sup>26</sup> The meeting recording method according to claim 1, wherein the event is a remark by a conference participant of the conference, and the conference information obtained by photographing the conference participant who made the remark is selected and recorded for a certain period of time. ..

3.

<sup>33</sup> The event is a designation of conference information by an administrator who manages the conference, and is characterized in that the conference information designated by the administrator from the conference information group is selected and recorded for a certain period of time. The described meeting recording method.

4.

40 The meeting recording method according to claim 1, wherein the meeting information group includes electronic data of the presentation material presented at the meeting, and the event is a change in the presentation content of the presentation material.

5.

46 The conference information group includes electronic data of an image written on an electronic whiteboard used in the conference, and the event is an execution of writing on the electronic whiteboard. The described meeting recording method.

6.

52 The meeting recording method according to claim 1, wherein the meeting information selected from the meeting information group is recorded in association with each meeting information of the meeting information group.

7.

58 In a conference recording device that records at least a plurality of conference information including a video of a conference situation, a conference information distribution means for distributing a selectable conference information group to a plurality of conference participants and a conference information distribution means for distribution. Among the meeting information of the conference information group, the conference information group is based on the selection information acquisition means for acquiring the selection information of the conference information selected by the conference participants and the selection information acquired by the selection information acquisition means. 1 from the conference information group based on the viewing rate calculation means for calculating the viewing rate of each conference information, the event detecting means for detecting a predetermined event in the conference, and the viewing rate calculated by the viewing rate calculation means. In addition to selecting and recording the conference information, when the event detecting means detects the event, the conference information corresponding to the event is selected and recorded for a certain period of time from each conference information in the conference information group. A conference recording device including a conference information recording means.

8.

77 The event detecting means detects the remarks made by the conference participants of the conference as the events, and the conference information recording means takes a picture of the conference participants who made the remarks detected by the event detecting means.

The conference recording device according to claim 7, wherein information is selected and recorded for a certain period of time.

9.

<sup>85</sup> The event detecting means detects the designation of the conference information by the administrator who manages the conference as the event, and the conference information recording means constants the conference information designated by the administrator from the conference information group. The conference recording device according to claim 7, wherein the time is selected and recorded.

10.

<sup>93</sup> The conference information group includes electronic data of the presentation material presented at the conference, the event detecting means detects a change in the presentation content of the presentation material as the event, and the conference record information recording means The conference recording device according to claim 7, wherein electronic data of the presentation material is selected and recorded for a certain period of time.

11.

<sup>101</sup> The conference information group includes electronic data of an image written on the electronic whiteboard used in the conference, and the event detecting means detects the execution of writing on the electronic whiteboard as the event. The conference recording device according to claim 7, wherein the conference information recording means selects and records electronic data of an image written on an electronic whiteboard for a certain period of time.

12.

<sup>110</sup> The conference recording device according to claim 7, wherein the conference information recording means records the conference information selected from the conference information group in association with each conference information of the conference information group.

13.

<sup>117</sup> In a conference recording program that causes a computer to record a plurality of conference information including at least a video of a conference situation, a conference information distribution step of distributing a selectable conference information group to a plurality of conference participants, and the conference information. Of the conference information of the conference information group delivered in the distribution step, the selection information

acquisition step for acquiring the selection information of the conference information selected by the conference participants and the selection information acquired in the selection information acquisition step are used. The conference information is based on a viewing rate calculation step for calculating the viewing rate of each conference information in the conference information group, an event detection step for detecting a predetermined event in the conference, and a viewing rate calculated in the viewing rate calculation step. When one conference information is selected from the group and recorded, and when the event is detected in the event detection step, the conference information corresponding to the event among the conference information of the conference information group is stored for a certain period of time. A conference recording program comprising a conference information recording step for selecting and recording.

14.

<sup>136</sup> The event detection step detects the remarks made by the conference participants of the conference as the events, and the conference information recording step is a conference in which the conference participants who made the remarks detected in the event detection step are photographed. 13. The conference recording program according to claim 13, wherein information is selected and recorded for a certain period of time.

15.

<sup>144</sup> The event detection step detects the designation of the conference information by the administrator who manages the conference as the event, and the conference information recording step constants the conference information designated by the administrator from the conference information group. 13. The meeting recording program according to claim 13, wherein the time is selected and recorded.

16.

<sup>152</sup> The conference information group includes electronic data of the presentation material presented at the conference, the event detection step detects a change in the presentation content of the presentation material as the event, and the conference information recording step is: The conference recording program according to claim 13, wherein the electronic data of the presentation material is selected and recorded for a certain period of time.

17.

<sup>160</sup> The conference information group includes electronic data of an image written on the electronic whiteboard used in the conference, and the event detection step detects the execution of writing on the electronic whiteboard as the event. The conference recording program according to claim 13, wherein the conference information recording step selects

and records electronic data of an image written on an electronic whiteboard for a certain period of time.

18.

<sup>169</sup> 13. The meeting recording program according to claim 13, wherein the meeting information recording step records the meeting information selected from the meeting information group in association with each meeting information of the meeting information group.

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(54) 【発明の名称】 会議記録方法および装置並びにプログラム

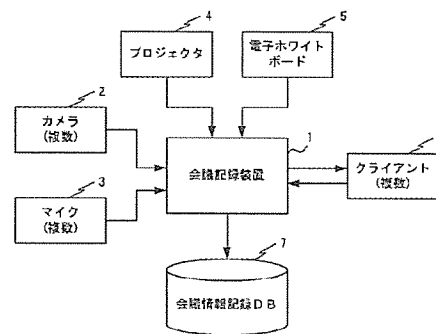
## (57) 【要約】

【課題】 会議の状況を会議情報として効率よく記録し、記録した会議情報を有効に利用することのできる会議記録方法および装置並びにプログラムを提供する。

【解決手段】 カメラ2で撮影した映像やプロジェクタ4に表示された資料、電子ホワイトボード5に書き込まれた画像等を会議情報としてクライアント6に配信し、その視聴率に基づいて記録する会議情報を選択するとともに、会議において発言や電子ホワイトボード5への書き込み等のイベントが発生した際には、これを検知して当該イベントに対応する会議情報を一定時間選択して記録する。

【選択図】

図1



(2)

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## 【 特許請求の範囲】

## 【 請求項1 】

少なくとも会議の状況を撮影した映像を含む複数の会議情報を記録する会議記録方法において、

選択可能な会議情報群を複数の会議参加者に視聴させるとともに、該複数の会議参加者のそれぞれによる選択に基づいて前記会議情報群の各会議情報の視聴率を算出し、該算出した視聴率に基づいて前記会議情報群から1の会議情報を選択して記録し、  
前記会議において所定の事象が生じた場合に、前記会議情報群の各会議情報のうち、前記事象に対応する会議情報を一定時間選択して記録することを特徴とする会議記録方法。

10

## 【 請求項2 】

前記事象は、

前記会議の会議参加者による発言であり、該発言を行った会議参加者を撮影した会議情報を一定時間選択して記録することを特徴とする請求項1記載の会議記録方法。

## 【 請求項3 】

前記事象は、

前記会議を管理する管理者による会議情報の指定であり、該管理者により前記会議情報群から指定された会議情報を一定時間選択して記録することを特徴とする請求項1記載の会議記録方法。

## 【 請求項4 】

前記会議情報群は、

前記会議において提示されるプレゼンテーション資料の電子データを含み、

前記事象は、前記プレゼンテーション資料の提示内容の変化である

ことを特徴とする請求項1記載の会議記録方法。

20

## 【 請求項5 】

前記会議情報群は、

前記会議において使用される電子ホワイトボードに書き込まれた画像の電子データを含み、

前記事象は、前記電子ホワイトボードへの書き込みの実行である

ことを特徴とする請求項1記載の会議記録方法。

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## 【 請求項6 】

前記会議情報群から選択された会議情報を前記会議情報群の各会議情報と関連付けて記録することを特徴とする請求項1記載の会議記録方法。

## 【 請求項7 】

少なくとも会議の状況を撮影した映像を含む複数の会議情報を記録する会議記録装置において、

選択可能な会議情報群を複数の会議参加者に配信する会議情報配信手段と、

前記会議情報配信手段が配信した会議情報群の各会議情報のうち、前記会議参加者が選択した会議情報の選択情報を取得する選択情報取得手段と、

前記選択情報取得手段が取得した選択情報に基づいて、前記会議情報群の各会議情報の視聴率を算出する視聴率算出手段と、

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前記会議における所定の事象を検知する事象検知手段と、

前記視聴率算出手段が算出した視聴率に基づいて前記会議情報群から1の会議情報を選択して記録するとともに、前記事象検知手段が前記事象を検知した場合に、前記会議情報群の各会議情報のうち前記事象に対応する会議情報を一定時間選択して記録する会議情報記録手段と

を具備することを特徴とする会議記録装置。

## 【 請求項8 】

前記事象検知手段は、

前記会議の会議参加者による発言を前記事象として検知し、

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前記会議情報記録手段は、前記事象検知手段により検知された発言を行った会議参加者を撮影した会議情報を一定時間選択して記録することを特徴とする請求項7記載の会議記録装置。

【請求項9】

前記事象検知手段は、

前記会議を管理する管理者による会議情報の指定を前記事象として検知し、

前記会議情報記録手段は、前記管理者により前記会議情報群から指定された会議情報を一定時間選択して記録する

ことを特徴とする請求項7記載の会議記録装置。

【請求項10】

前記会議情報群は、

前記会議において提示されるプレゼンテーション資料の電子データを含み、

前記事象検知手段は、前記プレゼンテーション資料の提示内容の変化を前記事象として検知し、

前記会議情報記録手段は、前記プレゼンテーション資料の電子データを一定時間選択して記録する

ことを特徴とする請求項7記載の会議記録装置。

【請求項11】

前記会議情報群は、

前記会議において使用される電子ホワイトボードに書き込まれた画像の電子データを含み

、  
前記事象検知手段は、前記電子ホワイトボードへの書き込みの実行を前記事象として検知し、

前記会議情報記録手段は、電子ホワイトボードに書き込まれた画像の電子データを一定時間選択して記録する

ことを特徴とする請求項7記載の会議記録装置。

【請求項12】

前記会議情報記録手段は、

前記会議情報群から選択された会議情報を前記会議情報群の各会議情報と関連付けて記録することを特徴とする請求項7記載の会議記録装置。

【請求項13】

少なくとも会議の状況を撮影した映像を含む複数の会議情報の記録をコンピュータに実行させる会議記録プログラムにおいて、

選択可能な会議情報群を複数の会議参加者に配信する会議情報配信ステップと、

前記会議情報配信ステップで配信した会議情報群の各会議情報のうち、前記会議参加者が選択した会議情報の選択情報を取得する選択情報取得ステップと、

前記選択情報取得ステップで取得した選択情報に基づいて、前記会議情報群の各会議情報の視聴率を算出する視聴率算出ステップと、

前記会議における所定の事象を検知する事象検知ステップと、

前記視聴率算出ステップで算出した視聴率に基づいて前記会議情報群から1の会議情報を選択して記録するとともに、前記事象検知ステップで前記事象を検知した場合に、前記会議情報群の各会議情報のうち前記事象に対応する会議情報を一定時間選択して記録する会議情報記録ステップと

を具備することを特徴とする会議記録プログラム。

【請求項14】

前記事象検知ステップは、

前記会議の会議参加者による発言を前記事象として検知し、

前記会議情報記録ステップは、前記事象検知ステップで検知された発言を行った会議参加者を撮影した会議情報を一定時間選択して記録する

ことを特徴とする請求項13記載の会議記録プログラム。



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## 【請求項15】

前記事象検知ステップは、  
前記会議を管理する管理者による会議情報の指定を前記事象として検知し、  
前記会議情報記録ステップは、前記管理者により前記会議情報群から指定された会議情報を一定時間選択して記録することを特徴とする請求項13記載の会議記録プログラム。

## 【請求項16】

前記会議情報群は、  
前記会議において提示されるプレゼンテーション資料の電子データを含み、  
前記事象検知ステップは、前記プレゼンテーション資料の提示内容の変化を前記事象として検知し、  
前記会議情報記録ステップは、前記プレゼンテーション資料の電子データを一定時間選択して記録することを特徴とする請求項13記載の会議記録プログラム。

## 【請求項17】

前記会議情報群は、  
前記会議において使用される電子ホワイトボードに書き込まれた画像の電子データを含み、  
前記事象検知ステップは、前記電子ホワイトボードへの書き込みの実行を前記事象として検知し、  
前記会議情報記録ステップは、電子ホワイトボードに書き込まれた画像の電子データを一定時間選択して記録することを特徴とする請求項13記載の会議記録プログラム。

## 【請求項18】

前記会議情報記録ステップは、  
前記会議情報群から選択された会議情報を前記会議情報群の各会議情報と関連付けて記録することを特徴とする請求項13記載の会議記録プログラム。

## 【発明の詳細な説明】

## 【0001】

## 【発明の属する技術分野】

この発明は、会議記録方法および装置並びにプログラムに関し、特に、会議の状況を撮影した映像等の会議情報を時系列で記録する会議記録方法および装置並びにプログラムに関する。

## 【0002】

## 【従来の技術】

近年、会議等の議事録を文書として保存する以外の方法として、会議の映像や音声を記録して保存するといったことが行われている。会議の映像や音声を記録する技術としては、単にカメラで撮影した映像を記録して保存しておくだけでなく、その記録が真正なものであることを保証するものもある（例えば、特許文献1参照）。

## 【0003】

一方、撮影を行うカメラ等が複数存在する場合に、利用価値の高い映像を記録する技術としては、本願出願人が出願した特願2001-287740号の明細書に記載した技術等がある。この技術は、複数の映像若しくは1の映像の任意の一部を選択して視聴可能な1つの映像としてを配信する際に、各映像の選択状態を取得し、この選択状態に基づいて各映像の視聴率を算出して、算出した視聴率に基づいて複数の映像を順次並び替える編集を行って記録用の映像を生成するものである。

## 【0004】

## 【特許文献1】

特開2001-309366号公報

## 【0005】



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【 発明が解決しようとする課題】

しかしながら、上述の特願2001-287740号の明細書に記載した技術を会議の記録に適用しようとした場合、プロジェクタや大型ディスプレイに表示されたプレゼンテーション用の資料やホワイトボード等へ書き出された情報も一旦カメラで撮影して記録することとなるため、その映像品質が劣化することもあると考えられる。

【 0006】

そこで、この発明は、会議の状況を会議情報として効率よく記録し、記録した会議情報を有効に利用することのできる会議記録方法および装置並びにプログラムを提供することを目的とする。

【 0007】

【 課題を解決するための手段】

上述した目的を達成するため、請求項1の発明は、少なくとも会議の状況を撮影した映像を含む複数の会議情報を記録する会議記録方法において、選択可能な会議情報群を複数の会議参加者に視聴させるとともに、該複数の会議参加者のそれぞれによる選択に基づいて前記会議情報群の各会議情報の視聴率を算出し、該算出した視聴率に基づいて前記会議情報群から1の会議情報を選択して記録し、前記会議において所定の事象が生じた場合に、前記会議情報群の各会議情報のうち、前記事象に対応する会議情報を一定時間選択して記録することを特徴とする。

【 0008】

また、請求項2の発明は、請求項1の発明において、前記事象は、前記会議の会議参加者による発言であり、該発言を行った会議参加者を撮影した会議情報を一定時間選択して記録することを特徴とする。

【 0009】

また、請求項3の発明は、請求項1の発明において、前記事象は、前記会議を管理する管理者による会議情報の指定であり、該管理者により前記会議情報群から指定された会議情報を一定時間選択して記録することを特徴とする。

【 0010】

また、請求項4の発明は、請求項1の発明において、前記会議情報群は、前記会議において提示されるプレゼンテーション資料の電子データを含み、前記事象は、前記プレゼンテーション資料の提示内容の変化であることを特徴とする。

【 0011】

また、請求項5の発明は、請求項1の発明において、前記会議情報群は、前記会議において使用される電子ホワイトボードへ書き込まれた画像の電子データを含み、前記事象は、前記電子ホワイトボードへの書き込みの実行であることを特徴とする。

【 0012】

また、請求項6の発明は、請求項1の発明において、前記会議情報群から選択された会議情報を前記会議情報群の各会議情報と関連付けて記録することを特徴とする。

【 0013】

また、請求項7の発明は、少なくとも会議の状況を撮影した映像を含む複数の会議情報を記録する会議記録装置において、選択可能な会議情報群を複数の会議参加者に配信する会議情報配信手段と、前記会議情報配信手段が配信した会議情報群の各会議情報のうち、前記会議参加者が選択した会議情報の選択情報を取得する選択情報取得手段と、前記選択情報取得手段が取得した選択情報に基づいて、前記会議情報群の各会議情報の視聴率を算出する視聴率算出手段と、前記会議における所定の事象を検知する事象検知手段と、前記視聴率算出手段が算出した視聴率に基づいて前記会議情報群から1の会議情報を選択して記録するとともに、前記事象検知手段が前記事象を検知した場合に、前記会議情報群の各会議情報のうち前記事象に対応する会議情報を一定時間選択して記録する会議情報記録手段とを具備することを特徴とする。

【 0014】

また、請求項8の発明は、請求項7の発明において、前記事象検知手段は、前記会議の会

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議参加者による発言を前記事象として検知し、前記会議情報記録手段は、前記事象検知手段により検知された発言を行った会議参加者を撮影した会議情報を一定時間選択して記録することを特徴とする。

【 0 0 1 5 】

また、請求項9の発明は、請求項7の発明において、前記事象検知手段は、前記会議を管理する管理者による会議情報の指定を前記事象として検知し、前記会議情報記録手段は、前記管理者により前記会議情報群から指定された会議情報を一定時間選択して記録することを特徴とする。

【 0 0 1 6 】

また、請求項10の発明は、請求項7の発明において、前記会議情報群は、前記会議において提示されるプレゼンテーション資料の電子データを含み、前記事象検知手段は、前記プレゼンテーション資料の提示内容の変化を前記事象として検知し、前記会議情報記録手段は、前記プレゼンテーション資料の電子データを一定時間選択して記録することを特徴とする。

【 0 0 1 7 】

また、請求項11の発明は、請求項7の発明において、前記会議情報群は、前記会議において使用される電子ホワイトボードに書き込まれた画像の電子データを含み、前記事象検知手段は、前記電子ホワイトボードへの書き込みの実行を前記事象として検知し、前記会議情報記録手段は、電子ホワイトボードに書き込まれた画像の電子データを一定時間選択して記録することを特徴とする。

【 0 0 1 8 】

また、請求項12の発明は、請求項7の発明において、前記会議情報記録手段は、前記会議情報群から選択された会議情報を前記会議情報群の各会議情報と関連付けて記録することを特徴とする。

【 0 0 1 9 】

また、請求項13の発明は、少なくとも会議の状況を撮影した映像を含む複数の会議情報の記録をコンピュータに実行させる会議記録プログラムにおいて、選択可能な会議情報群を複数の会議参加者に配信する会議情報配信ステップと、前記会議情報配信ステップで配信した会議情報群の各会議情報のうち、前記会議参加者が選択した会議情報の選択情報を取得する選択情報取得ステップと、前記選択情報取得ステップで取得した選択情報に基づいて、前記会議情報群の各会議情報の視聴率を算出する視聴率算出ステップと、前記会議における所定の事象を検知する事象検知ステップと、前記視聴率算出ステップで算出した視聴率に基づいて前記会議情報群から1の会議情報を選択して記録するとともに、前記事象検知ステップで前記事象を検知した場合に、前記会議情報群の各会議情報のうち前記事象に対応する会議情報を一定時間選択して記録する会議情報記録ステップとを具備することを特徴とする。

【 0 0 2 0 】

また、請求項14の発明は、請求項13の発明において、前記事象検知ステップは、前記会議の会議参加者による発言を前記事象として検知し、前記会議情報記録ステップは、前記事象検知ステップで検知された発言を行った会議参加者を撮影した会議情報を一定時間選択して記録することを特徴とする。

【 0 0 2 1 】

また、請求項15の発明は、請求項13の発明において、前記事象検知ステップは、前記会議を管理する管理者による会議情報の指定を前記事象として検知し、前記会議情報記録ステップは、前記管理者により前記会議情報群から指定された会議情報を一定時間選択して記録することを特徴とする。

【 0 0 2 2 】

また、請求項16の発明は、請求項13の発明において、前記会議情報群は、前記会議において提示されるプレゼンテーション資料の電子データを含み、前記事象検知ステップは、前記プレゼンテーション資料の提示内容の変化を前記事象として検知し、前記会議情報

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記録ステップは、前記プレゼンテーション資料の電子データを一定時間選択して記録することを特徴とする。

【 0 0 2 3 】

また、請求項17の発明は、請求項13の発明において、前記会議情報群は、前記会議において使用される電子ホワイトボードに書き込まれた画像の電子データを含み、前記事象検知ステップは、前記電子ホワイトボードへの書き込みの実行を前記事象として検知し、前記会議情報記録ステップは、電子ホワイトボードに書き込まれた画像の電子データを一定時間選択して記録することを特徴とする。

【 0 0 2 4 】

また、請求項18の発明は、請求項13の発明において、前記会議情報記録ステップは、前記会議情報群から選択された会議情報を前記会議情報群の各会議情報と関連付けて記録することを特徴とする。

【 0 0 2 5 】

【 発明の実施の形態 】

以下、この発明に係る会議記録方法および装置並びにプログラムの一実施の形態について、添付図面を参照して詳細に説明する。

【 0 0 2 6 】

図1は、この発明を適用した会議記録システムの概略構成を示すブロック図である。同図に示すように、会議記録システムは、会議記録装置1とカメラ2、マイク3、プロジェクタ4、電子ホワイトボード5、クライアント6を具備して構成される。

【 0 0 2 7 】

会議記録装置1は、会議の状況を映像や音声等の会議情報として記録する。カメラ2は、会議の状況を撮影して映像として出力するもので、通常、複数のものが利用される。マイク3は、会議での音声を取得して音声情報として出力するもので、通常、複数のものが利用される。

【 0 0 2 8 】

プロジェクタ4は、会議において提示されるプレゼンテーション資料等を表示するものである。なお、会議記録装置1は、プレゼンテーション用の資料を電子データの形式若しくはビデオ信号の形式で取得するため、プロジェクタ4は、実際には、プロジェクタ制御用のコンピュータ装置（クライアント6と兼用する場合もある）に相当する。また、プロジェクタ4は、大型のディスプレイに置き換えることもできる。さらに、会議を遠隔地間で開催する等の場合に、プロジェクタ4が複数存在する場合もあるが、この場合でも全てのプロジェクタ4に同一のプレゼンテーション資料が提示されることとなるので、その資料は、1つとなる。

【 0 0 2 9 】

電子ホワイトボード5は、ホワイトボード若しくはこれに準ずるもので、任意の文字や画像が書き込み可能であるとともに、書き込まれた画像を電子データの形式で出力できるものである。また、会議を遠隔地間で開催する等の場合には、複数の電子ホワイトボード5が用いられることもあるが、この場合には、1の電子ホワイトボード5に書き込みが行われると他の電子ホワイトボード5にもその書き込み内容が表示される仕様のものを利用する。

【 0 0 3 0 】

クライアント6は、会議の参加者が利用するコンピュータ装置であり、会議記録装置1から配信される映像等の会議情報を閲覧するために、ブラウザが搭載されているものである。また、クライアント6からプロジェクタ4へプレゼンテーション用の資料を提示させる場合や、クライアント6から電子ホワイトボード5への書き込みを行う場合には、それぞれ対応するソフトウェアを必要とする。

【 0 0 3 1 】

会議情報記録DB7は、会議記録装置1が取得した会議情報と、これを編集した会議情報を記録するデータベースである。ここに記録される会議情報としては、カメラ2で撮影さ

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れた映像の映像信号、マイク3が取得した音声の音声信号、プロジェクタ4から取得した映像信号および資料のアプリケーションデータ、電子ホワイトボード5から取得した映像信号、これらを会議記録装置1で編集した編集結果がある。なお、会議情報記録DB7には、少なくとも会議記録装置1で編集された編集結果が保存される。

【0032】

なお、会議記録装置1とカメラ2、マイク3、プロジェクタ4、電子ホワイトボード5、クライアント6は、LANやWAN、インターネット等のネットワークにより接続されていればよく、必ずしも一つの会議室に全てが配置される必要はない。

【0033】

次に、会議記録装置1の詳細について説明する。図2は、会議記録装置1の機能的な構成を示したブロック図である。会議記録装置1は、コンピュータ装置により構成することができ、その場合には、図2に示す各部は、ソフトウェアにより構成する。

【0034】

同図に示すように、会議記録装置1は、会議情報取得部11と会議情報配信部12、選択情報取得部13、視聴率算出部14、イベント検知部15、会議情報編集部16、会議情報保存部17を具備して構成される。

【0035】

会議情報取得部11は、カメラ2やマイク3、プロジェクタ4、電子ホワイトボード5から映像信号や音声信号等を会議情報として取得する。

【0036】

会議情報配信部12は、会議情報取得部11が取得した会議情報をブラウザにより閲覧できる形式でクライアント6に配信する。また、必要に応じて、例えば、会議室内等に設置するプロジェクタ等に映像を配信する場合等には、会議情報取得部11が取得した会議情報に加えて、これらを会議情報編集部16で編集した編集結果も配信する。

【0037】

クライアント6に配信された会議情報は、そのブラウザに、例えば、図3に示す画面60のように表示される。この画面60には、映像61、映像62、映像63、映像64、映像65、映像66が表示されている。映像61は、当該ブラウザを操作する会議参加者が映像62、映像63、映像64、映像65、映像66のいずれかから選択した映像を拡大表示したものである。また、例えば、映像62、映像63、映像64は、カメラ2で撮影された映像であり、映像65は、プロジェクタ4に表示されているプレゼンテーション資料の映像、映像66は、電子ホワイトボード5に書き込まれた画像の映像である。このように、クライアント6で、会議参加者が所望の会議情報に注目して閲覧を行うことができるように、会議情報配信部12は、会議情報を配信する。また、このとき、マイク3が取得した音声は、合成若しくは適宜選択されて、映像とともに配信される。

【0038】

選択情報取得部13は、各クライアント6で会議参加者が選択した会議情報の選択情報を取得する。取得した選択情報は、会議情報配信部12に通知されて、会議情報配信部12により映像61として表示する会議情報の配信に利用される。また、この選択情報は、視聴率算出部14にも通知される。

【0039】

視聴率算出部14は、選択情報取得部13が各クライアント6から取得した選択情報に基づいて、各会議情報の視聴率を算出する。

【0040】

イベント検知部11は、会議において発生したイベントを検知する。検知するイベントとしては、マイク3が取得する音声情報に基づく会議参加者の発言や、プロジェクタ4に提示される資料の切り替え（ページ変更等）、電子ホワイトボード5への書き込みがあり、これらは、会議情報取得部11が取得した会議情報から検知される。また、この他にもイベントとして、議長等の会議管理者による会議情報選択がある。これは、会議の終了前等に会議での決定事項が表示されている会議情報を選択した場合等であり、このイベントは

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会議管理者が使用するクライアント 6 から取得する。

【 0 0 4 1 】

会議情報編集部 1 6 は、会議情報取得部 1 1 が取得した会議情報を時系列で編集する。この編集に際しては、視聴率算出部 1 4 が算出した視聴率とイベント検知部 1 5 が検知したイベントの発生を利用する。例えば、通常は、視聴率算出部 1 4 が算出した視聴率に基づいて会議情報の編集を行い、イベント検知部 1 5 がイベントの発生を検知した場合には、そのイベントに対応する会議情報を一定時間選択する。

【 0 0 4 2 】

視聴率に基づく会議情報の編集方法としては、様々なものが考えられるが、その 1 つとしては、複数の会議情報のうち、視聴率が最高のものである。この方法では、時々刻々と変化する視聴率に連動して、常に視聴率が最高の会議情報が選択され、これらを時系列に繋ぎ合わせたものが編集結果の会議情報となる。また、別の方法としては、一定時間の視聴率の比を算出し、この視聴率の比に応じて会議情報のそれぞれを時系列で選択する方法や、通常は特定の会議情報を選択しておき、予め定めた視聴率を越える会議情報がある時間には、その会議情報を選択し、これらを時系列に繋ぎ合わせる方法である。

【 0 0 4 3 】

また、イベントが発生した場合には、その発生から一定時間、当該イベントに対応する会議情報を挿入する。例えば、マイク 3 による音声情報から会議参加者による発言をイベントとして検知した場合には、対応するカメラ 2 が撮影した会議参加者の映像（会議情報）を選択し、プロジェクタ 4 に提示される資料の切り替えや電子ホワイトボード 5 への書き込みがあった場合には、それぞれプロジェクタ 4 から取得される会議情報、電子ホワイトボード 5 から取得される会議情報を選択する。また、議長等の会議管理者が所定の会議情報を選択した場合、例えば、会議での決定事項が表示されている会議情報を選択した場合等には、これを選択することで、編集後の会議情報に会議での決定事項の表示が含まれることとなる。

【 0 0 4 4 】

なお、ここでは、会議情報の編集方法を複数示したが、実際に会議情報を記録する際には、予めどのような方法で編集を行うかを会議記録装置 1 に設定しておくこととなる。

【 0 0 4 5 】

会議情報保存部 1 7 は、会議情報編集部 1 6 により編集された会議情報を会議情報記録 DB 7 に保存する。このとき、会議情報取得部 1 1 が取得した会議情報のそれぞれを併せて保存することもでき、これらを保存する場合には、編集された会議情報と編集前のそれぞれの会議情報とをリンクを張る等して関連付けて保存する。

【 0 0 4 6 】

次に、会議記録装置 1 における会議情報の編集処理の流れを説明する。図 4 は、会議記録装置 1 の会議情報の編集処理の流れを示すフローチャートである。

【 0 0 4 7 】

会議記録装置 1 は、動作を開始すると、終了指示があるまでの間（ステップ 1 0 1 で N O）、会議情報編集部 1 6 が、各部から取得される複数の会議情報のうち、視聴率算出部 1 4 が算出する視聴率に基づいて決定される会議情報を通常用の会議情報として選択する（ステップ 1 0 2）。

【 0 0 4 8 】

ここで、イベント検知部 1 5 がイベントの発生を検知すると（ステップ 1 0 3 で Y E S）、会議情報編集部 1 6 は、発生したイベントに対応する会議情報を選択し（ステップ 1 0 4）、一定時間の経過を待つ（ステップ 1 0 5 で N O）。そして、一定時間が経過すると（ステップ 1 0 5 で Y E S）、再び、通常用として視聴率算出部 1 4 が算出する視聴率に基づいて決定される会議情報を選択する（ステップ 1 0 2）。

【 0 0 4 9 】

その後、管理者等から終了指示が入力されると（ステップ 1 0 1 で Y E S）、会議記録装

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置1は、会議情報の編集処理を終了する。

【0050】

次に、会議記録装置1を含む会議記録システムの適用例を説明する。図5は、1室の会議室内での会議を記録する場合の会議記録システムの構成例を示した図である。

【0051】

同図に示すように、会議室内には、複数のカメラ2(2-1~2-3)と、複数のマイク3(3-1~3-3)、プロジェクタ4、電子ホワイトボード5、複数のクライアント6(6-1~6-7)、プロジェクタ8が配置される。なお、会議記録装置1は、同図には示していないが、実際には、これらと接続されて、会議情報の配信や編集、記録等の処理を行う。

【0052】

この構成においては、カメラ2-1とマイク3-1、カメラ2-2とマイク3-2、カメラ2-3とマイク3-3がそれぞれ対応し、例えば、カメラ2-1の撮影範囲とマイク3-1の音声取得範囲がほぼ一致する。また、各クライアント6には、図3に示したようなブラウザ画面が表示され、各クライアント6の操作者は、それぞれ所望の会議情報を選択することが可能である。また、この構成においては、会議記録装置1は、音声の配信は行う必要はない(記録は行う)。

【0053】

プロジェクタ4には、プレゼンテーション用の資料が表示されるが、この資料は、例えば、クライアント6-4の操作により、その表示が切り替えられる。電子ホワイトボード5には、任意な書き込みが可能である。また、プロジェクタ8には、カメラ2のそれぞれが撮影した会議情報と、この会議情報のうち、視聴率に基づいて選択された会議情報が拡大されて表示される。

【0054】

この構成で会議を行う場合、通常は、カメラ2のそれぞれが撮影した会議情報であるA、B、Cとプロジェクタ4に表示される会議情報であるD、電子ホワイトボード5に表示される会議情報であるEのそれぞれがその視聴率に基づいて適宜選択されて記録される。

【0055】

この状態でイベントが発生すると、例えば、クライアント6-2を操作する参加者が発言を行うと、その音声マイク3-1で取得され、これに伴って、カメラ2-1が撮影した会議情報であるAが一定時間選択されて記録される。また、クライアント6-4を操作する参加者が、プロジェクタ4に表示する資料を切り替えると、これに伴って、プロジェクタ4に表示される会議情報が一定時間選択されて記録される。さらに、別の参加者が電子ホワイトボード5への書き込みを行うと、これに伴って、電子ホワイトボード5に表示される会議情報が一定時間選択されて記録される。また、会議の終了時に、例えば、議長であるクライアント6-1の操作者が、強制的な意味でそのブラウザから電子ホワイトボード5に表示される会議情報を選択すると、これに伴って、電子ホワイトボード5に表示される会議情報が一定時間選択されて記録され、電子ホワイトボード5に会議での決定事項が表示されていれば、これが記録されることとなる。

【0056】

図6は、複数の会議室をネットワークで接続した遠隔会議を記録する場合の会議記録システムの構成例を示した図である。

【0057】

同図に示すように、会議室201には、カメラ2-4とマイク3-4、プロジェクタ4-1、電子ホワイトボード5-1、クライアント6-8等が配置され、会議室202には、カメラ2-5とマイク3-5、プロジェクタ4-2、電子ホワイトボード5-2、クライアント6-9等が配置され、会議室203には、カメラ2-6とマイク3-6、プロジェクタ4-3、電子ホワイトボード5-3、クライアント6-10等が配置されている。そして、これらがネットワーク210を介してそれぞれ接続されている。なお、会議記録装置1は、同図には示していないが、実際には、ネットワーク210に接続されて、会議情



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報の配信や編集、記録等の処理を行う。

【 0 0 5 8 】

この構成においては、カメラ 2-4 とマイク 3-4、カメラ 2-5 とマイク 3-5、カメラ 2-6 とマイク 3-6 がそれぞれ対応する。また、各クライアント 6（符号を付していないものも含む）には、図 3 に示したようなブラウザ画面が表示され、各クライアント 6 の操作者は、それぞれ所望の会議情報を選択することが可能である。また、この構成においては、会議記録装置 1 は、音声の配信も行う。

【 0 0 5 9 】

各プロジェクト 4（4-1 ～ 4-3）には、プレゼンテーション用の資料が表示されるが、この資料は、例えば、クライアント 6-8 の操作により、表示されるもので、プロジェクト 4-1、プロジェクト 4-2、プロジェクト 4-3 の全てに同一の資料が表示される。また、電子ホワイトボード 5-1、電子ホワイトボード 5-2、電子ホワイトボード 5-3 には、それぞれ任意な書き込みが可能であり、その書き込み内容は、三者で共有される。例えば、電子ホワイトボード 5-1 への書き込みが行われると、電子ホワイトボード 5-2 と電子ホワイトボード 5-3 へもその書き込み内容が表示される。

【 0 0 6 0 】

この構成で会議を行う場合、通常は、カメラ 2 のそれぞれが撮影した会議情報である A、B、C とプロジェクト 4 に表示される会議情報である D、電子ホワイトボード 5 に表示される会議情報である E のそれぞれがその視聴率に基づいて適宜選択されて記録される。

【 0 0 6 1 】

この状態でイベントが発生すると、例えば、クライアント 6-10 を操作する参加者が発言を行うと、その音声マイク 3-6 で取得され、これに伴って、カメラ 2-6 が撮影した会議情報である C が一定時間選択されて記録される。また、クライアント 6-8 を操作する参加者が、プロジェクト 4-1 に表示する資料を切り替えると、これに伴って、プロジェクト 4-1 に表示される会議情報（プロジェクト 4-2、プロジェクト 4-3 にも同様の会議情報が表示される）が一定時間選択されて記録される。さらに、別の参加者が電子ホワイトボード 5-1 への書き込みを行うと、これに伴って、電子ホワイトボード 5-1 に表示される会議情報が一定時間選択されて記録される。また、会議の終了時に、例えば、議長であるクライアント 6-9 の操作者が、強制的な意味でそのブラウザから電子ホワイトボード 5-2 に表示される会議情報を選択すると、これに伴って、電子ホワイトボード 5-2 に表示される会議情報が一定時間選択されて記録され、電子ホワイトボード 5-2 に会議での決定事項が表示されていれば、これが記録されることとなる。

【 0 0 6 2 】

なお、会議記録装置 1 を利用した会議システムの構成は、ここで説明した例に限らず、その会議の規模や開催地点等に応じて、適宜変更することが可能である。

【 0 0 6 3 】

このような構成により、会議記録装置 1 が編集して記録した会議情報を議事録に代えて参照することで、その会議の内容を容易に確認することができる。また、会議記録装置 1 が編集した会議情報とともに、編集前の会議情報を関連付けて記録した場合には、その会議における詳細な情報をも確認することが可能である。さらに、特許文献 1 に示した技術等を併用することで、会議情報を会議記録として保証のあるものとして利用することが可能である。

【 0 0 6 4 】

【 発明の効果 】

以上説明したように、この発明によれば、カメラで撮影した映像やプロジェクトに表示された資料、電子ホワイトボードに書き込まれた画像等を会議情報として配信し、その視聴率に基づいて記録する会議情報を選択するとともに、会議においてイベントが発生した際には、当該イベントに対応する会議情報を一定時間選択して記録するように構成したので、編集者を要することなく、適切に会議情報を記録することができ、編集後の会議情報を議事録に代えて参照することが可能となる。



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## 【図面の簡単な説明】

【図1】この発明を適用した会議記録システムの概略構成を示すブロック図である。

【図2】会議記録装置1の機能的な構成を示したブロック図である。

【図3】クライアント6でのブラウザによる表示画面例を示した図である。

【図4】会議記録装置1の会議情報の編集処理の流れを示すフローチャートである。

【図5】1室の会議室内での会議を記録する場合の会議記録システムの構成例を示した図である。

【図6】複数の会議室をネットワークで接続した遠隔会議を記録する場合の会議記録システムの構成例を示した図である。

## 【符号の説明】

1 会議記録装置

2、2-1～2-6 カメラ

3、3-1～3-6 マイク

4、4-1～4-3 プロジェクタ

5、5-1～5-3 電子ホワイトボード

6、6-1～6-10 クライアント

7 会議情報記録DB

8 プロジェクタ

11 会議情報取得部

12 会議情報配信部

13 選択情報取得部

14 視聴率算出部

15 イベント検知部

16 会議情報編集部

17 会議情報保存部

60 画面

61 映像

62 映像

63 映像

64 映像

65 映像

66 映像

201 会議室

202 会議室

203 会議室

210 ネットワーク

073



10

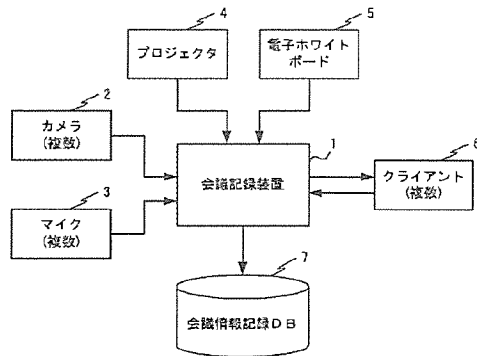
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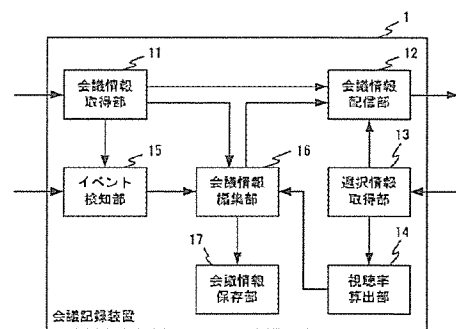
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JP 2004-112638 A 2004.4.8

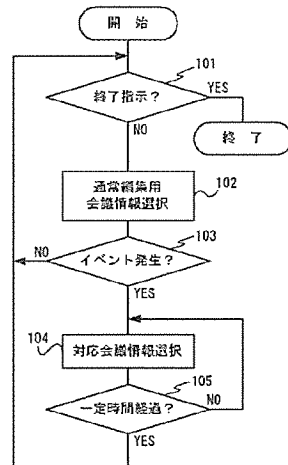
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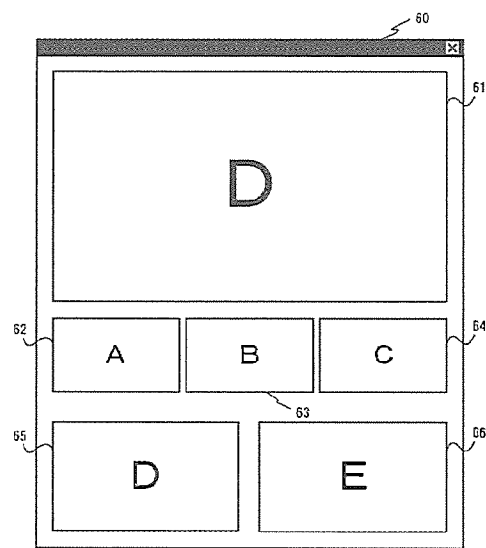
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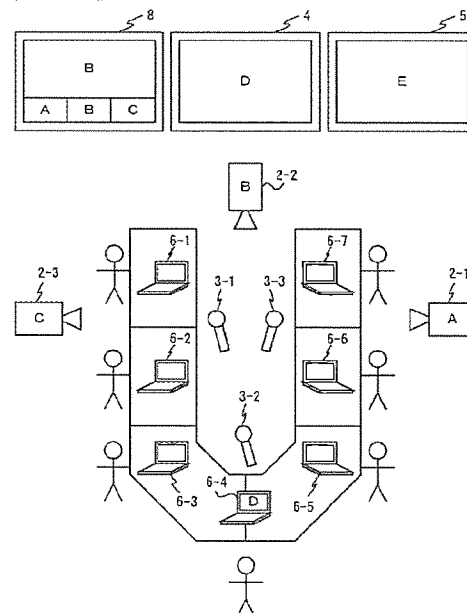
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【 図 3 】



【 図 5 】



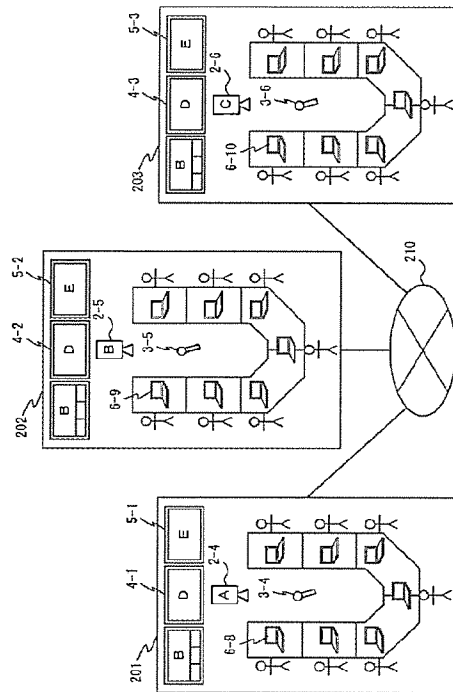
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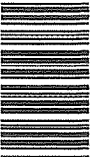
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【 図 6 】



093



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			NN06 NN07 NN18

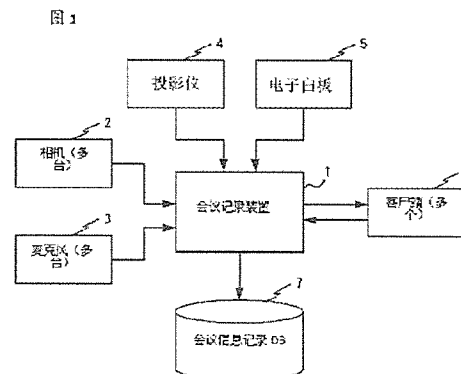
(54) 【发明名称】一种会议记录方法及装置以及程序

(57) 【摘要】

【技术问题】本发明可提供一种可将会议情况作为会议信息高效率地记录下来、并可将所记录的会议信息有效利用的会议记录方法及装置以及程序。

【解决技术问题】将相机 2 拍摄的影像、投影仪 4 放映的资料、在电子白板 5 上画的图像等作为会议信息发送至客户端 6，在基于视听率选择会议信息的同时，当会议中存在发言或在电子白板 5 上存在书写内容时，能够检测到并将相应的信息按一定的时间段记录下来。

【摘要附图】图 1



**JPH07123384A MULTIMEDIA CONFERENCE PROCEEDING PREPARING DEVICE**Patent  
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Classifications

IPC

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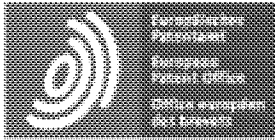
JPH07123384A

MULTIMEDIA CONFERENCE PROCEEDING PREPARING DEVICE

Abstract

**PURPOSE:**To provide the multimedia conference proceeding preparing device in a dispersed conference system where a person can participate in a conference in his own seat., he can edit a proceeding in his seat and he can easily prepare, approve and distribute the proceeding.

**CONSTITUTION:**A dispersed conference system performing a multi-spot communication conference is constituted by connecting a conference terminal 40 and a conference server 60 where multimedia information composed of video, sound and data is treated by a communications network 300. In the conference terminal 40 and the conference server 60, a sound and video recorder for recording the sound and video in the conference to prepare a multimedia conference proceeding and a sound and video controller performing instructions on the start and termination of the recording of video and sound are provided.



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## Notice

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## DESCRIPTION JPH07123384A

[0001]

<sup>13</sup> INDUSTRIAL APPLICABILITY The present invention relates to a distributed conference system in which conference terminals that handle multimedia information including video, audio, and data are connected by a communication line between remote locations and a communication conference is held between multiple points. The present invention relates to a multimedia conference record creating device that creates a conference record of the communication conference using multimedia information such as voice, video, still image, and text.

[0002]

<sup>22</sup> BACKGROUND ART Conventionally, as a remote conference system, as shown in FIG. 16, a system in which a conference room between two points is connected via a wide area network 30 is known.

<sup>25</sup> The configuration of this system consists of two communication terminals having a video system including a camera 10-3 and a television 10-4 capable of capturing and displaying a plurality of participants, and an audio system including a microphone 10-1 and a speaker 10-2. The devices 10 and 10' are connected by a wide area network 30. Here, the participants can be captured by the camera 10-3, the other participants can be projected on the television 10-4, and opinions can be exchanged and discussed with each other using the microphone 10-1 and the speaker 10-2. With such a configuration, it is possible to hold a conference with a sense of realism even if you are far away.

[0003]

<sup>36</sup> It is also possible to display the figure written on the electronic blackboard using the electronic blackboard system 10-5 as an auxiliary device on the television (not displayed in the figure) of

the other party's electronic blackboard system.

39 Further, by using the facsimile 10-6, the materials of the conference can be transmitted. The remote control device 20 controls these elements. And even if such a system is connected via the wide area network 30 and is separated from each other, the conference can be held.

[0004]

45 PROBLEM TO BE SOLVED: To solve a problem. By the way, one of the operational problems of such a conventional remote conference system is the problem of creating and approving minutes.

48 Each time a meeting is held, it is necessary to create a minutes and distribute the minutes to a large number of meeting participants. For the minutes creator, the work of creating and approving the minutes is time-consuming, and the time spent on editing and distribution such as correction and deletion of the minutes is not foolish. Approval of minutes is usually obtained only at the next meeting.

[0005]

56 Therefore, the present invention can create and edit minutes at one's own seat using multimedia information such as voice, video, still image, and text, and can easily create, approve, and distribute the minutes. The purpose is to provide the device.

[0006]

62 Means for Solving the Problems In order to achieve the above object, the present invention connects a conference terminal that handles multimedia information including video, audio, and data via a communication network, and communicates between multiple points. In a multimedia conference record creation device that creates a conference record of a distributed conference system using multimedia information, the instruction means for instructing the start and end of recording of the conference record during the conference and the instruction means are used. It is provided with a conference record creating means for creating a conference record by using the multimedia information by recording the contents of the communication conference from the designated recording start time to the recording end time. It is characterized by doing.

[0007]

75 [Action] According to the present invention, the recording start and recording end of the minutes are instructed during the conference by the instruction means, and the communication conference is performed from the recording start time to the recording end time instructed by the instruction means. Minutes are created using the multimedia information by recording the content using the multimedia information.

80 As a result, the minutes can be created and edited at one's own seat, and the minutes can be easily approved, distributed, and searched.

[0008]

85 Hereinafter, the multi-media conference minutes creating apparatus of the present invention will be described in detail with reference to the accompanying drawings.

[0009]

90 First, a distributed conference system to which the present invention is applied will be described.

[0010]

95 FIG. 1 shows a basic configuration of a distributed conference system to which the present invention is applied. The distributed conference system includes a conference server 60, a plurality of conference terminals 40, and a communication network 300 connecting them. It is composed.

99 Here, as the communication network 300, a wide area network such as a wideband ISDN network or a premises network such as an ATM-LAN or an STM multimedia LAN can be used.

[0011]

104 The plurality of conference terminals 40 include a video system including a camera 41-3 and a terminal device 42, an audio system including a microphone 41-1 and a speaker 41-2, and a conference terminal control device, respectively. 44 is provided.

[0012]

110 The video from the camera 41-3 of each conference terminal 40 and the audio from the microphone 41-1 are sent to the conference server 60 via the conference terminal control device 44, the respective video and audio are synthesized, and the conference terminal 40 is again used. Is sent to, and is reproduced by the speaker 41-2 and the terminal device 42 through the conference terminal control device 44.

115 This allows conference participants to hear the audio and video of other participants.

[0013]

119 Specifically, the terminal device 42 can be realized by a personal computer or a workstation.  
120 Since these personal computers and workstations have a built-in video board for displaying images, the images sent from the conference server 60 via the conference terminal control



device 44 can be displayed in the window of the screen. ..

123 In addition, there are electronic blackboard / digitizer 41-5 and facsimile 41-6 as options for peripheral devices, which are used for sending and receiving digital image information and still images.

126 Further, the conference terminal 40 and the conference server 60 are provided with minutes editing devices 45 and 65, respectively, as described later.

[0014]

131 FIG. 2 shows the detailed configuration of the conference server 60 shown in FIG.

132 In FIG. 2, the conference server 60 includes a service control system 61, a state monitoring terminal 62, and a minutes editing device 65, and the minutes editing device 65 includes a recording device 63 for recording voice and images, voice, and It is configured to include a recording control device 64 for controlling the recording of images.

[0015]

139 The service control system 61 receives video signals, voice signals, data, and call control data from the conference terminal 40, multiplexes them, represents them in a fixed format having a plurality of windows, and reconnects them to the conference terminal 40 through the communication network 300. Perform the operation of sending.

143 Further, the condition monitoring terminal 62 is connected to the service control system 61 and manages the operation of the system.

[0016]

148 The recording device 63 constituting the meeting minutes editing device 65 records the multimedia minutes.

150 Further, the recording control device 64 controls the recording device 63 when the minutes editor edits the minutes.

[0017]

155 The configuration of the service control system 61 is shown in FIG.

156 The service control system 61 is composed of modules M1 to Mn, and the same modules M1 to Mn are prepared for each line L1 to Ln or each conference terminal 40.

158 The service control system 61 is connected to the minutes editing device 65, and inputs / outputs video signals, audio signals, data, and call control data to the minutes editing device 65.

[0018]

- 164 The function of the service control system 61 will be described along with the module M1 of the line 1 (L1).
- 166 The line interface unit 610-1 receives video signals, voice signals, data, and call control data from the video processing unit 611-1, the voice processing unit 612-1, the data processing unit 614, and the call control unit 613-1 to perform multiplexing. It is transmitted to the network 300.
- 170 On the contrary, the signal is received from the network 300, separated, and the video signal, the audio signal, and the data are passed to the video processing unit 611-1, the audio processing unit 612-1, and the data processing unit 614.
- 173 The video processing unit 611-1 outputs the input video signal from the line interface unit 611-1 to the image selection unit 618 after synchronizing with the other lines L2 to Ln, and controls the control unit 615 from the plurality of images flowing there. Under the control of the minutes editing device 65 selects / synthesizes images and sends them to the network 300 again via the line interface unit 610-1. With the selective composition function of the image processing unit 611-1, it is possible to combine images such as 1 screen, 2 screens, 4 screens, and 9 screens. For example, in the case of two screens, it is composed of a full screen and a small screen. In the case of 4 screens and 9 screens, it will be as shown in FIGS. 6 (a) and 6 (b) described later.

#### [0019]

- 185 The voice processing unit 612-1 recovers the input voice signal from the line interface unit 610-1 and outputs it to the voice highway 617.
- 187 Then, according to the instruction from the control unit 615 via the control highway 619, the conference record editing device 65 performs selective voice addition and coding such as N-1 addition that adds only the own voice, and then performs the line interface unit 610- again. It is sent to the network 300 via 1. Since there is a difference between the audio and video delays, delay the audio by a fixed amount so that it is not unnatural on the terminal.

#### [0020]

- 195 The call control unit 613-1 controls / monitors the line interface unit 610-1 and controls the call setting.
- 197 The connection between the call control unit 613-1 and the control unit 615 is made via the control highway 619. The control unit 615 controls / monitors the entire inside of the service control system 61 and the minutes editing device 65 via the control highway 619. It also interfaces with the condition monitoring terminal 62.

#### [0021]

- 204 These operations are performed in exactly the same manner in the modules M2 to Mn of the other lines and the lines 2 to line n (L2 to Ln), and the line interface units 610-2 to 610-n in

each of the line modules M2 to Mn. Similar to the line interface unit 610-1 of the module M1, the video processing unit 611-2-611-n is the same as the video processing unit 611-1 of the module M1, and the audio processing unit 612-2-612-n is the module M1. The call control unit 613-2-613 to n, which is the same as the voice processing unit 612-1 of the above, functions in the same manner as the call control unit 613-1 of the module M1.

[0022]

214 Further, the data processing unit 614 receives the packet data from the arbitrary line interface unit 610-1 to 610-n via the data highway, stores the packet data in the minutes editing device 65, and then again the arbitrary line interface via the data highway. It is transmitted to the conference terminal 40 via the network 300 via the units 610-1 to 610-n.

[0023]

221 FIG. 4 shows a detailed configuration of the conference terminal 40 of the embodiment shown in FIG.

223 In FIG. 4, the conference editing device 45 in the conference terminal 40 instructs a storage device 46 for recording voice and images and its start and stop, that is, start and end of storage of voice or image, as shown in FIG. It is configured to include a storage control device 47, a terminal device 42 for the minutes editor, and a delay device 48.

[0024]

230 FIG. 6 shows an example of displaying the screen of the terminal device 42 in the case where the images of the individual conference participants are displayed in this embodiment.

232 The screen of the terminal device 42 is divided into four according to the number of participants as shown in image 42-11 shown in FIG. 6A, or divided into nine as shown in image 42-12 shown in FIG. 6B. ..

235 You can also open windows 42-13 on a portion of the screen and use it as text to individually send information to participants, for example as e-mail.

[0025]

240 The audio and image storage device 46 may be individually configured with an audio recorder and a video recorder, or may be integrated.

242 The audio and image storage control device 47 controls the recording operation of the audio recorder and the video recorder, or an integrated device, and as a simple example, it can be realized by a device in which a plurality of push switches are arranged.

245 FIG. 7 shows an example of the panel arrangement of each switch of the voice and image storage control device 47 when a plurality of push switches are arranged and realized. In the control of the voice and image storage control device 47 having this panel, the voice and the

image are recorded and controlled at the same time. The voice and image storage control device 47 may control the voice and the image individually, but it is preferable as the conference minutes creating device to synchronize the voice and the image and control the recording at the same time. The operation of the conference editing device 45 in the conference terminal 40 will be briefly described.

[0026]

256 The voice and image signals during the conference are simultaneously input to the conference editor terminal device 42 and the delay circuit 48 via the conference terminal control device 44.

259 The delay device 48 transfers the audio and video during the actual conference to the audio and image storage control device 47, which records the minutes, with a slight delay. During the conference, the minutes editor looks at the screen of the terminal device 42 of the conference terminal 40 of the conference editor and starts and stops the recording of the minutes from the voice and image storage control device 47. Since the recording start signal from the voice and image storage control device 47 is not delayed and the recording stop signal is output delayed by the delay time of the delay device, it is possible to record without missing the information before and after the recording start and the recording stop are applied. ..

[0027]

271 As shown in FIG. 8, the conference editing device 45 in the conference terminal 40 may be provided with two sets of a voice and image storage device 46 and a voice and image storage control device 47.

274 As will be described later, by using such a conference editing device 45, it is possible to easily edit the minutes in one conference terminal 40.

[0028]

279 The configuration of the conference terminal control device 44 is shown in FIG.

280 The line interface unit 44-1 includes a video signal from the video transmission / reception unit 44-2, an audio signal from the audio transmission / reception unit 44-3, call control data from the call control unit 44-4, and data from the data transmission / reception unit 44-5. Is received, multiplexed, and transmitted to the conference server 60 via the network 300. On the contrary, the signal from the conference server 60 is received via the network 300, each signal is separated, and the video transmission / reception unit 44-2, the audio transmission / reception unit 44-3, the call control unit 44-4, and the data transmission / reception unit 44- Send to 5.

[0029]

291 The video transmission / reception unit 44-2 is connected to the video board built in the terminal and the camera 41-3, and the NTSC signal from the camera 41-3 is digitized and sent to the line interface unit 44-1.

294 Further, the signal from the line interface unit 44-1 is converted into an analog signal and sent to the video board built in the terminal and the camera 41-3. The voice transmission / reception unit 44-3 performs coding / recombination processing of the voice signals of the microphone 41-1 and the speaker 41-2 to perform transmission / reception processing between the line interface unit 44-1 and the line interface unit 44-1. The data transmission / reception unit 44-5 is connected to the terminal device 42, and can send the data from the terminal device 42 to the conference server 60 and the data stored in the conference server 60 to the terminal device 42.

[0030]

305 The call control unit 44-4 supports control / monitoring of the line interface unit 44-1 and connection control of lines such as voice, data, and video.

307 The control unit 44-6 is connected to the video transmission / reception unit 44-2, the audio transmission / reception unit 44-3, the call control unit 44-4, and the data transmission / reception unit 44-5 via the control highway 44-7, and each of them is connected. It manages and has an interface with the terminal device 42, and performs cooperative operation with the terminal device 42.

[0031]

315 FIG. 10 shows a display example of the multimedia minutes displayed on the display 42-1 of the terminal device 42 of this embodiment.

317 The conference participants to whom the minutes are distributed can receive the minutes A, B, C in the form of video, still image, audio or text on the display 42-1 displayed in this way. In FIG. 10, 42-1 is a display of the terminal device 42, 42-2, 42-3 and 42-4 are windows for displaying the minutes A, B, and C, and 42-5 is a window for command input.

[0032]

324 In the figure, window 42-2 showing the minutes A is a text screen, which can be used to display text or as a medium for e-mail.

326 In the window 42-3 showing the minutes B, the state of the meeting such as the facial expressions of the meeting participants is displayed by video, and the contents of the conversation are displayed by voice. In this window, the person who is speaking is clarified by displaying such as blinking ● at the conference participants who are speaking at the conference. Window 42-4 displays the minutes C as additional minutes. In addition to displaying supplementary items for meeting records, materials submitted at other meetings

and past meetings are displayed here.

[0033]

336 In FIG. 10, windows 42-2, 42-3, and 42-4 displaying the minutes A, B, and C are all displayed on the display 42-1. However, the windows are individually displayed and have already been viewed. If you close the window of the minutes and read the next minutes, you can get the minutes that are easier to read or read.

[0034]

343 FIG. 11 shows another display example of the multimedia minutes displayed on the display 42-1 of the terminal device 42.

345 In the figure, the text is displayed in the window 42-2 for the minutes A, the conference image is displayed in the window for the minutes B, and the command input screen is displayed in the command window 42-5.

[0035]

351 FIG. 12 shows yet another display example of the multimedia minutes displayed on the display 42-1 of the terminal device 42.

353 In this example, many types of meeting minutes are displayed in one window, and the meeting minutes display menu is selected with a mouse or the like to display the state of the meeting and the contents of the meeting summarized in text as the meeting minutes.

356 Which of FIGS. 10, 11 or 12 should be displayed can be appropriately selected depending on the purpose and content of the minutes.

[0036]

361 Next, the method of editing the minutes after the meeting is described.

[0037]

365 There are two ways for the minutes editor to read the recorded minutes.

366 One is a method of reading the minutes recorded from the conference server 60, and the other is reading from the audio and image storage device 46 in the minutes editing device 45 of the conference terminal 40 in the hands of the conference minutes editor. The method.

[0038]

372 In the former case, the terminal device 42 of the minutes editor and the conference server 60 are connected, the minutes editor reads the minutes from the conference server 60, and the

audio and image storage device 63 stores the read minutes. To edit.

375 The conference record recorded during the conference is always recorded as a master file in the conference server 60.

377 The minutes editor looks at the minutes editor terminal device 42 and if there is a place he wants to record, he presses the recording start button of the voice and image storage control device 47 to record, and when he does not need to record, he presses the recording stop button to record. If you want to record again, stop and press the recording start button again to edit.

[0039]

385 The addition to the minutes is performed by temporarily disconnecting the connection between the minutes editor terminal device 42 and the meeting server 60 and using the camera 41-3, the microphone 41-1 and the terminal device 42 of the own meeting terminal 40.

389 Then, when the editing addition is completed, the minutes editor terminal device 42 and the conference server 60 are reconnected, the play button of the voice and image storage control device 47 is pressed to reproduce the edited contents, and the conference terminal control device 44 is pressed. The edited minutes are transmitted to the conference server 60 via the conference server 60, and recorded separately from the master file.

[0040]

397 On the other hand, in the latter case, as shown in FIG. 8, another audio and image storage device 46-2 and an audio and image storage control device 47-2 are prepared.

399 Then, the contents of the conference are recorded as a master file in the voice and image storage device 46-1 during the conference, and the recorded conference record is recorded in the voice and image storage control device 47-1 with the other voice and the other voice. It is read into the image storage device 46-2, and the recording start button and the recording stop button of the second voice and image storage control device 47-2 are operated to re-record and edit the necessary parts. Editing of Minutes After finishing the recording, if there is an addition, the conference being edited in the second audio and image storage device 46-2 using the camera 41-3, the microphone 41-1 and the terminal device 42. Add to the record.

[0041]

411 Such editing of the minutes can be performed promptly if the audio and image storage control devices 47 and 64 have a fast-forward / fast-rewind function.

413 In addition to manually controlling the buttons of the voice and image storage control device 47, the voice and image storage devices 46 and 63 can also be controlled by using the command input screen 42-5 of the minutes editor terminal device 42. ..



[0042]

419 FIG. 13 shows an example of the editing screen of the minutes editor terminal device 42.

420 On this editing screen, a monitor screen 42-3 for monitoring the minutes when editing the minutes or playing back the minutes and a voice and image storage control screen 42-5 can be displayed. Each function of the voice and image storage control screens 42-5 can be activated by a method such as clicking with a mouse. With reference to FIG. 14, the effect of time reduction by the present invention will be shown. Minutes are recorded by recording audio and images during the meeting. If you want to record the entire time during the meeting, you need to record the same time as the time  $t_1$  spent in the meeting, but if you limit the recording of the minutes to the important part or the conclusion part, keep the minutes simple. The time can be shortened accordingly. If the time of these important parts and the conclusion part is  $t_2 \cdot 1, t_2 \cdot 2 \dots t_2 \cdot n$ , the recording time of the minutes master file is  $t_3 = t_2 \cdot 1 + t_2 \cdot 2 + \dots + t_2 \cdot n < t_1$ . Furthermore, if only the necessary parts  $t_4 \cdot 1, t_4 \cdot 2 \dots t_4 \cdot n$  are taken up from the master file by editing, the conference record record length  $t_5$  of the edited word is  $t_5 = t_4 \cdot 1 + t_4 \cdot 2 + \dots + t_4 \cdot n < t_3$ . You can shorten the time. Assuming that the minutes editor has made additional recordings for  $t_6$  hours, the final length  $t_7$  of the minutes is  $t_7 = t_5 + t_6$ .

[0043]

438 The time loss here can be shortened by playing back the recording at the time of editing by fast-forwarding and fast-rewinding as much as possible.

440 The more concise the edited minutes are, the shorter the time it takes to read the minutes distributed by the meeting participants, and the points and conclusions of the meeting can be clarified. The time  $t_{10}$  required for editing the minutes is the sum of the playback time  $t_8$  of the minutes master file, the time  $t_9$  for playing and checking the edited minutes, and the additional record  $t_6$  of the minutes editor. It can be shortened by fast-forwarding the playback of.

[0044]

449 If the terminal that receives the conference record is also equipped with a voice and image storage device 46 and a voice and image storage control device 47, the receiver can read the conference minutes even faster, skip unnecessary parts, and see what they want to see. Only can be extracted and viewed slowly.

[0045]

456 FIG. 15 shows an example of the connection configuration of the remote conference system.

457 There are two types of conference terminals 40: panela conference terminals 40-1 to 40-4



and floor conference terminals 40-5 to 40-8.

459 The panel conference terminals 40-1 to 40-4 are always connected to the conference server 60 by multimedia bidirectional connections 301 to 304, and can transmit and receive audio, moving images, data, and the like. The user of the panel conference terminals 40-1 to 40-4 is a panel participant who can always speak during the conference, and the appearance is normally displayed on the divided screen 42-3. The conference terminal of the conference editor must be this panel conference terminal 40-1 to 40-4. The floor conference terminals 40-5 to 40-8 are always connected to the conference server 60 by a multimedia connection 310 for one-way downlink, and can receive audio and moving images to see and hear the contents of the conference. In addition to this one-way connection 310, a two-way connection 320 is also prepared, and if necessary, this two-way connection 320 is set up between the conference server 60 and the floor conference terminal 40-5 to 40-8. You can send and receive data, audio, and video. As a result, the voice of the floor participant's speech can be transmitted from the floor conference terminal 40-5 to 40-8 of the floor participant to the panel participant and the moderator via the conference server 60 together with the video of the speaker. However, the user of the floor conference terminal 40-5 to 40-8 can appear on the screen only while speaking.

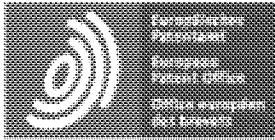
[0046]

478 INDUSTRIAL APPLICABILITY As described above, according to the present invention, a conference terminal that handles multimedia information is connected by a communication network to form a distributed conference system, and a conference is being held in order to realize multimedia minutes. Since the audio and video recording device for recording audio and video and the audio and video recording control device for instructing the start and end of recording of audio and video are provided, the conference participants participate in the conference at their own seats. And the minutes editor can also create the minutes at his / her own desk.

[0047]

489 In addition, since the minutes are created by the method of recording multimedia, the minutes can be created and edited easily and in a short time, so the time devoted to editing the minutes after the meeting can be shortened, and the approval of the meeting and the meeting can be shortened. The minutes can be distributed within a short time after the meeting is over.

494 In addition, the minutes can be transferred to the minutes server and easily referenced from the terminal at any time.



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## CLAIMS JPH07123384A

1.

<sup>13</sup> Multimedia conference record that creates a conference record of a distributed conference system that connects conference terminals that handle multimedia information including video, audio, and data via a communication network and conducts communication conferences between multiple points. In the creating device, the content of the communication conference is described between the instruction means for instructing the recording start and recording end of the conference record recording during the conference and the recording start time to the recording end time instructed by the instruction means. A multimedia conference record creating device comprising a conference record creating means for creating a conference record using the multimedia information by recording using the multimedia information.

2.

<sup>25</sup> The first aspect of claim 1, wherein the minutes created by the minutes are presented to the meeting participants at the end of the meeting, and the meeting minutes are further provided with the minutes presentation means for modifying and accepting the minutes at the end of the meeting. Multimedia conference recording device.

3.

<sup>32</sup> Predetermined: a minutes recording means for recording the minutes created by the minutes, a reading means for reading the minutes stored in the minutes recording means after the end of the meeting, and a predetermined meeting minutes read by the reading means. The multimedia minutes-taking apparatus according to claim 1, further comprising an editing means for editing the minutes by designating the range of.

4.

<sup>40</sup> The first aspect of the present invention is characterized in that the meeting minutes creating means further includes a meeting minutes addition / correction means for adding and modifying the minutes by using voice or an image at the same time as recording the minutes. The described multimedia conference recording device.

5.

<sup>47</sup> It is characterized in that it is connected to the communication network and records the minutes created by the minutes-making means, and further comprises a minutes server in which the recorded minutes can be read by the conference participants. The multimedia minutes creation device according to claim 1.

6.

<sup>54</sup> Editing means for editing the minutes by adding information such as documents, images, and sounds used during the meeting to the minutes after the meeting, and ending the meeting with the minutes edited by the editing means. The multimedia minutes-making apparatus according to claim 1, further comprising means to be referred to later.

7.

<sup>61</sup> The multimedia conference record creating device according to claim 6, further comprising a transmission unit for transmitting the conference minutes edited by the editing means to the conference participants.

8.

<sup>67</sup> The conference record creating means includes a delay means for delaying multimedia information indicating the contents of the communication conference, a storage means for storing multimedia information delayed by the delay means, and a recording start instruction by the instruction means. , Recording of the conference record is started from the multimedia information stored in the storage means before a predetermined time, and when the instruction means gives a recording end instruction, the conference record is recorded until a predetermined time elapses from the recording end instruction. The multimedia conference recording creation device according to claim 1, further comprising a recording control means for continuing recording.



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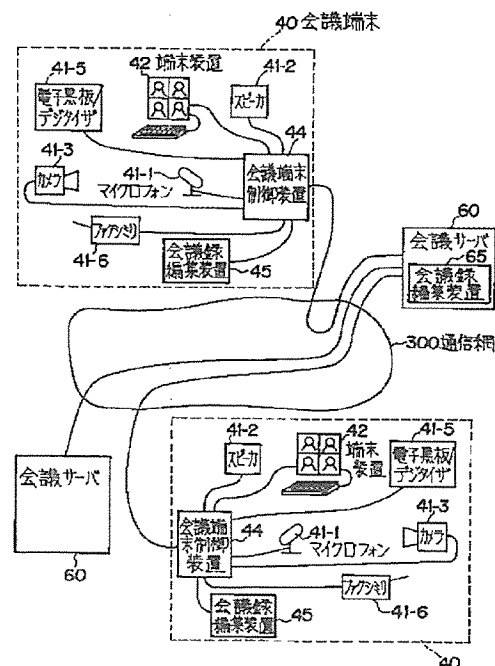
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(54) 【発明の名称】 マルチメディア会議録作成装置

(57) 【要約】

【目的】この発明の目的は、自席で会議に参加できると共に自席で会議録の編集ができ、会議録の作成、承認、配布が容易にできる分散会議システムに於けるマルチメディア会議録作成装置を提供することにある。

【構成】この発明では、映像、音声及びデータからなるマルチメディア情報を扱う会議端末(40)と会議サーバ(60)を通信網(300)により接続して多地点間で通信会議を行う分散会議システムを構成し、会議端末(40)および会議サーバ(60)中に、マルチメディア会議録を作成するために会議中の音声と映像を記録するための音声および映像記録装置と、音声と映像の記録の開始と終了などの指示を行なう音声および映像記録制御装置を設けてマルチメディア会議録作成装置を構成するようにする。



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## 【特許請求の範囲】

【請求項 1】 映像、音声およびデータを含むマルチメディア情報を扱う会議端末を通信網を介して接続し、多地点間で通信会議を行う分散会議システムの会議録をマルチメディア情報を用いて作成するマルチメディア会議録作成装置において、前記会議録の記録の記録開始と記録終了を会議中に指示する指示手段と、前記指示手段により指示された記録開始時点から記録終了時点までの間、前記通信会議の内容を前記マルチメディア情報を用いて記録することにより会議録を前記マルチメディア情報を用いて作成する会議録作成手段とを具備することを特徴とするマルチメディア会議録作成装置。

【請求項 2】 前記会議録作成手段により作成した会議録を会議終了時に会議参加者に提示し、該会議録の修正および承諾を会議終了時に行う会議録提示手段を更に具備することを特徴とする請求項 1 記載のマルチメディア会議録作成装置。

【請求項 3】 前記会議録作成手段により作成した会議録を記録する会議録記録手段と、前記会議録記録手段に記憶した会議録を会議終了後に読み出す読み出し手段と、前記読み出し手段により読み出された会議録の所定の範囲を指定することにより該会議録の編集を行う編集手段とを更に具備することを特徴とする請求項 1 記載のマルチメディア会議録作成装置。

【請求項 4】 前記会議録作成手段は、前記会議録の記録と同時に会議録編集者が音声あるいは画像を用いて会議録の追加および修正を行う会議録追加修正手段を更に具備することを特徴とする請求項 1 記載のマルチメディア会議録作成装置。

【請求項 5】 前記通信網に接続され、前記前記会議録作成手段で作成された会議録を記録するとともに、該記録された会議録が会議参加者により読み出し可能な会議録サーバを更に具備することを特徴とする請求項 1 記載のマルチメディア会議録作成装置。

【請求項 6】 前記会議中に使用された文書、画像、音声等の情報を会議終了後に前記会議録に追加することにより該会議録の編集を行う編集手段と、前記編集手段により編集された会議録を会議終了後に参照する手段とを更に具備することを特徴とする請求項 1 記載のマルチメディア会議録作成装置。

【請求項 7】 前記編集手段により編集された会議録を会議参加者に送信する送信手段を更に具備することを特徴とする請求項 6 記載のマルチメディア会議録作成装置。

【請求項 8】 前記会議録作成手段は、前記通信会議の内容を示すマルチメディア情報を遅延させる遅延手段と、

前記遅延手段により遅延されマルチメディア情報を記憶する記憶手段と、前記指示手段により記録開始指示があると、前記記憶手段に記憶された所定時間前のマルチメディア情報から前記会議録の記録を開始し、前記指示手段により記録終了指示があると、該記録終了指示から所定時間経過するまで前記会議録の記録を続ける記録制御手段とを具備することを特徴とする請求項 1 記載のマルチメディア会議録作成装置。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】 本発明は、遠隔地間で映像、音声およびデータを含むマルチメディア情報を扱う会議端末を通信回線により接続し、多地点間で通信会議を行う分散会議システムに関し、特に、該通信会議の会議録を音声、動画、静止画、テキスト等のマルチメディア情報を用いて作成するマルチメディア会議録作成装置に関する。

## 【0002】

【従来の技術】 従来、遠隔会議システムとしては、図 1 に示すように広域網 30 を経由して 2 地点間の会議室を結ぶ形式のものが知られている。このシステムの構成は、複数の参加者の撮像および表示ができるカメラ 10-3 およびテレビ 10-4 を含む映像系と、マイクロフォン 10-1 およびスピーカ 10-2 を含む音声系を有する 2 つの通信端末装置 10、10' を広域網 30 で結んで構成される。ここで、カメラ 10-3 で参加者をとらえ、テレビ 10-4 に相手の参加者を映しだし、またマイクロフォン 10-1 およびスピーカ 10-2 を利用して相互に意見の交換や議論が行える。このような構成により遠方においても臨場感溢れる会議が開催できる。

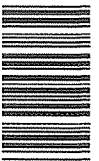
【0003】 また補助装置としての電子黒板システム 10-5 を用いて電子黒板に書いた図を相手の電子黒板システムのテレビ（図には表示していない）に表示することも可能である。さらにファクシミリ 10-6 を利用すれば、会議の資料を伝送することもできる。遠隔制御装置 20 はこれらの要素を制御する。そしてこのようなシステムが広域網 30 を介して接続され相互に離れていても会議を行うことができる。

## 【0004】

【発明が解決しようとする課題】 ところで、このような従来の遠隔会議システムの運用上の問題点の一つとして会議録の作成と承認の問題がある。会議を行うとその都度、会議録を作成して多数の会議参加者に会議録を配布する必要がある。会議録作成者にとって、会議録の作成や承認をとる作業は手間のかかるもので、会議録の訂正や削除などの編集作業や配布に費やされる時間は馬鹿にならない。また会議録の承認は次の会議開催時に初めて得られるのが普通である。

【0005】 そこで、本発明は、音声、動画、静止画、テキスト等のマルチメディア情報を使って、自席で会議

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録の作成、編集ができ、会議録の作成、承認、配布が容易にできるマルチメディア会議録作成装置を提供することを目的とする。

【0006】

【課題を解決するための手段】上述の目的を達成するため、本発明は、映像、音声およびデータを含むマルチメディア情報を扱う会議端末を通信網を介して接続し、多地点間で通信会議を行う分散会議システムの会議録をマルチメディア情報を用いて作成するマルチメディア会議録作成装置において、前記会議録の記録の記録開始と記録終了を会議中に指示する指示手段と、前記指示手段により指示された記録開始時点から記録終了時点までの間、前記通信会議の内容を前記マルチメディア情報を用いて記録することにより会議録を前記マルチメディア情報を用いて作成する会議録作成手段とを具備することを特徴とする。

【0007】

【作用】本発明によれば、会議録の記録の記録開始と記録終了を指示手段により会議中に指示し、この指示手段により指示された記録開始時点から記録終了時点までの間、通信会議の内容をマルチメディア情報を用いて記録することにより会議録を前記マルチメディア情報を用いて作成する。これにより、自席で会議録の作成、編集ができ、会議録の承認、配布および検索を容易に行うことができる。

【0008】

【実施例】以下、本発明のマルチメディア会議録作成装置を添付図面を参照して詳細に説明する。

【0009】まず、本発明が適用される分散会議システムについて説明する。

【0010】図1は、本発明が適用される分散会議システムの基本構成を示すもので、この分散会議システムは、会議サーバ60と、複数の会議端末40と、それらを接続する通信網300を具備して構成される。ここで、通信網300としては、広帯域ISDN網などの広域網またはATM-LAN又はSTMマルチメディアLANなどの構内網が使用できる。

【0011】複数の会議端末40は、それぞれ、カメラ41-3および端末装置42を含んで構成される映像系と、マイクロフォン41-1およびスピーカ41-2を含んで構成される音声系と、会議端末制御装置44を具備している。

【0012】各会議端末40のカメラ41-3からの映像とマイクロフォン41-1からの音声は会議端末制御装置44を経て会議サーバ60に送られ、それぞれの映像と音声の合成が行われ、再び会議端末40に送られ、会議端末制御装置44を通してスピーカ41-2、端末装置42で再生される。これにより会議参加者は他の参加者の音声を聞いたり映像を見ることができる。

【0013】端末装置42は、具体的にはパーソナルコ

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ンピュータやワークステーションで実現できる。これらのパーソナルコンピュータやワークステーションは映像表示用のビデオボードを内蔵しているので、会議サーバ60から会議端末制御装置44を経由して送られてきた映像を画面のウィンドウ内に表示することができる。このほか周辺機器のオプションとして電子黒板/デジタル41-5やファクシミリ41-6が有り、デジタル画像情報や静止画の送受に使われる。また、会議端末40および会議サーバ60には、後述するようにそれぞれ会議録編集装置45、65が設けられる。

【0014】図2は、図1に示した会議サーバ60の詳細構成を示したものである。図2において、会議サーバ60は、サービス制御システム61、状態監視端末62、会議録編集装置65を具備して構成され、会議録編集装置65は、音声及び画像を記録する記録装置63、音声及び画像の記録を制御する記録制御装置64を具備して構成される。

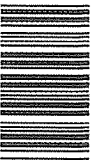
【0015】サービス制御システム61は、会議端末40からの映像信号、音声信号、データ、呼制御データを受取り、これを多重化して複数のウィンドウを持つ一定のフォーマットに表して再び通信網300を通じて会議端末40に送信する動作を行う。また、状態監視端末62は、サービス制御システム61に接続されており、システムの運用管理を行なう。

【0016】会議録編集装置65を構成する記録装置63はマルチメディア会議録の記録を行なう。また記録制御装置64は会議録編集者が会議録の編集を行なうとき記録装置63の制御を行なう。

【0017】サービス制御システム61の構成を図3に示す。サービス制御システム61はモジュールM1～Mnで構成され、各回線L1～Ln若しくは各会議端末40ごとに同一のモジュールM1～Mnが用意されている。なお、サービス制御システム61は、会議録編集装置65と接続しており、この会議録編集装置65に対して映像信号、音声信号、データ、呼制御データの入出力を行っている。

【0018】サービス制御システム61の機能を回線L1(L1)のモジュールM1に添って説明する。回線インタフェース部610-1は映像処理部611-1、音声処理部612-1、データ処理部614、呼制御部613-1から、映像信号、音声信号、データ、呼制御データを受取り多重化を行ない網300に送信する。またこの反対に網300から信号を受信し分離を行ない映像処理部611-1、音声処理部612-1、データ処理部614に映像信号、音声信号、データを渡す。映像処理部611-1は回線インタフェース部610-1からの入力映像信号を他の回線L2～Lnとの同期を行った後に画像選択部618へ出力し、そこを流れる複数の映像から制御部615の制御の下に、会議録編集装置65で映像の選択/合成を行ない再び回線インタフェース部6

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10-1を経由して網300に送出する。映像処理部611-1の選択合成機能により1画面、2画面、4画面、9画面等の映像を合成する事ができる。例えば2画面の場合はフル画面と小画面で構成される。4画面、9画面の場合は、後述する図6(a)、図6(b)のようになる。

【0019】音声処理部612-1は回線インタフェース部610-1からの入力音声信号の復合化を行ない音声ハイウエー617に出力する。ついで制御ハイウエー619経由の制御部615からの指示により、会議録編集装置65で自己の音声のみを除いて加算するN-1加算等の選択音声加算と符号化を行ない、再び回線インタフェース部610-1を経由して網300へ送出する。音声と映像の遅延に差があるため、音声を固定量遅延させて端末上で不自然でないようにする。

【0020】呼制御部613-1は回線インタフェース部610-1の制御/監視と呼設定制御を行なう。呼制御部613-1と制御部615との接続は制御ハイウエー619を経由して行われる。制御部615は制御ハイウエー619を経由してサービス制御システム61内部全体および会議録編集装置65の制御/監視を行なう。また状態監視端末62とのインタフェースを行なう。

【0021】これらの動作は他の回線、回線2〜回線n(L2〜Ln)のモジュールM2〜Mnでも全く同様に行われ、それぞれの回線モジュールM2〜Mnで回線インタフェース部610-2〜610-nは、モジュールM1の回線インタフェース部610-1と同様の、映像処理部611-2〜611-nはモジュールM1の映像処理部611-1と同様の、音声処理部612-2〜612-nはモジュールM1の音声処理部612-1と同様の、呼制御部613-2〜613-nはモジュールM1の呼制御部613-1と同様の働きをする。

【0022】また、データ処理部614は任意の回線インタフェース部610-1〜610-nからのパケットデータをデータハイウエー経由で受信し、会議録編集装置65で蓄積した後、再びデータハイウエー経由で任意の回線インタフェース部610-1〜610-nを経由して会議端末40に網300経由で送出する。

【0023】図4は、図1に示した実施例の会議端末40の詳細構成を示したものである。図4において、会議端末40内の会議編集装置45は、図5に示すように音声及び画像を記録する記憶装置46とその起動と停止、つまり音声あるいは画像の記憶の開始と終了等を指示する記憶制御装置47、会議録編集者の端末装置42、遅延装置48を具備して構成される。

【0024】図6は、この実施例において、端末装置42の画面の表示例を個々の会議参加者の映像が表示された場合で示したものである。端末装置42の画面は、図6(a)に示す画像42-11のように参加者の数に応じて4分割、あるいは図6(b)に示す画像42-12

のように9分割される。また画面の一部にウィンドウ42-13を開き、それをテキストとして使用して、参加者へ個別に情報を送信し、例えば電子メールとして利用できる。

【0025】音声及び画像記憶装置46は音声レコーダとビデオレコーダで個別に構成するか、或いは一体化したものをを用いても良い。音声及び画像記憶制御装置47はこの音声レコーダとビデオレコーダ、或いは一体化されたものの記録動作の制御を行うもので、簡単な例としては、プッシュ・スイッチを複数配置した装置で実現できる。プッシュ・スイッチを複数配置して実現した場合の音声及び画像記憶制御装置47の各スイッチのパネル配置の一例を図7に示す。このパネルを持つ音声及び画像記憶制御装置47の制御では音声と画像は同時に記録制御される。音声及び画像記憶制御装置47は音声と画像を個別に制御するものでも良いが、音声と画像を同期して同時に記録制御するほうが会議録作成装置としては好ましい。会議端末40内の会議編集装置45の動作に付いて簡単に説明する。

【0026】会議中の音声及び画像信号は会議端末制御装置44を経て会議編集者端末装置42と遅延回路48に同時に入力される。遅延装置48は会議録を記録する音声及び画像記憶制御装置47に、実際の会議中の音声と映像を多少遅らせたものを転送する。会議中に会議録編集者は会議編集者の会議端末40の端末装置42の画面を見て音声及び画像記憶制御装置47より会議録の記録スタートとストップをかける。音声及び画像記憶制御装置47からの記録スタート信号は遅れずに、記録ストップ信号は遅延装置の遅延時間分遅れて出力されるので記録スタートと記録ストップをかけた前後の情報が欠けることなく記録できる。

【0027】会議端末40内の会議編集装置45には、図8に示すように、音声及び画像記憶装置46と音声及び画像記憶制御装置47を2組設けたものをを用いることもできる。後述するように、このような会議編集装置45を用いると、1会議端末40内で会議録の編集が容易に実現できる。

【0028】会議端末制御装置44の構成を図9に示す。回線インタフェース部44-1は映像送受信部44-2からの映像信号と音声送受信部44-3からの音声信号、呼制御部44-4からの呼制御データ、データ送受信部44-5からのデータを受信し多重化して網300を経由して会議サーバ60に送信する。また反対に会議サーバ60からの信号を網300経由で受信して各々の信号を分離して映像送受信部44-2、音声送受信部44-3、呼制御部44-4、データ送受信部44-5に送信する。

【0029】映像送受信部44-2は端末に内蔵されたビデオボードとカメラ41-3に接続されており、カメラ41-3からのNTSC信号をデジタル化して回線イ

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インタフェース部44-1に送っている。また回線インタフェース部44-1からの信号をアナログ化し端末に内蔵されたビデオボードとカメラ41-3に送っている。

音声送受信部44-3はマイクロフォン41-1とスピーカ41-2の音声信号の符号化/復合化処理を行って回線インタフェース部44-1との送受信処理を行なっている。データ送受信部44-5は端末装置42と接続されており、端末装置42からのデータを会議サーバ60に送ったり、会議サーバ60に蓄積されているデータを端末装置42に送ることができる。

【0030】制御部44-4は回線インタフェース部44-1の制御/監視と音声、データ、映像等の回線の接続制御をサポートする。制御部44-6は制御ハイウエー44-7を経由して映像送受信部44-2や音声送受信部44-3、制御部44-4、データ送受信部44-5と接続されており、それぞれの管理を行なうとともに端末装置42とのインターフェースも持っており端末装置42との協調動作を行なう。

【0031】図10に、本実施例の端末装置42のディスプレイ42-1上に表示されたマルチメディア会議録の表示例を示す。会議録を配布される会議参加者は、この様に表示されたディスプレイ42-1上で会議録A、B、Cを映像、静止画、音声或いはテキストの形式で受け取ることができる。図10で42-1は端末装置42のディスプレイ、42-2、42-3及び42-4は会議録A、B、Cを表示するウィンドウ、42-5はコマンド入力用のウィンドウである。

【0032】図中、会議録Aを現すウィンドウ42-2はテキスト画面で、テキストを表示するために、或いは電子メールの媒体として使用できる。会議録Bを現すウィンドウ42-3には会議参加者の表情など会議の様子を映像で表示し、会話の内容を音声で表示する。このウィンドウでは会議で発言中の会議参加者のところに●が点滅するなどの表示をして発言中の人物を明確にしている。ウィンドウ42-4は追加議事録としての会議録Cを表示する。ここには会議の記録の補助的な事項を表示するほか、他の会議、過去の会議で提出された資料などを表示する。

【0033】図10では会議録A、B、Cを表示するウィンドウ42-2、42-3及び42-4が一斉にディスプレイ42-1上に表示されているが、ウィンドウを個別に表示し、既に見終わった会議録のウィンドウは閉じて次の会議録を読んで行くようにすれば、さらに読みやすい或いは見易い会議録が得られる。

【0034】図11に、端末装置42のディスプレイ42-1上に表示されたマルチメディア会議録の他の表示例を示す。図では会議録A用のウィンドウ42-2にテキストが、会議録B用のウィンドウに会議画像が、コマンド用のウィンドウ42-5にコマンド入力画面が表示されている。

【0035】図12に、端末装置42のディスプレイ42-1上に表示されたマルチメディア会議録の更に別の表示例を示す。この例では1つのウィンドウ内に多種類の会議録が表示され、会議録表示メニューをマウス等で選択し、会議の様子やテキストにまとめられた会議の内容を会議録として表示している。図10、図11或いは図12のうちのどの表示にするかは会議録の目的や内容により適宜選択できる。

【0036】次に会議終了後の会議録の編集方法について述べる。

【0037】会議録編集者が記録された会議録を読み出すには2通りの方法がある。1つは会議サーバ60から記録してある会議録を読み出す方法であり、もう1つは会議録編集者の手元にある会議端末40の会議録編集装置45内の音声及び画像記憶装置46から読み出す方法である。

【0038】前者の場合、会議録編集者の端末装置42と会議サーバ60を接続し、会議録編集者が会議録を会議サーバ60から読みだし、音声及び画像記憶装置63に読み出した会議録を記憶させながら編集する。会議サーバ60には常に会議中に記録した会議録をマスタファイルとして記録しておく。会議録編集者は会議録編集者端末装置42を眺めて記録したい場所があれば音声及び画像記憶制御装置47の記録スタートボタンを押して記録し、記録する必要のないところでは記録ストップボタンを押して記録を止め、再度記録したいところがあれば再度記録スタートボタンを押すという方法で編集していく。

【0039】会議録に対しての追加は会議録編集者端末装置42と会議サーバ60の接続を一旦切断して、自会議端末40のカメラ41-3、マイクロフォン41-1及び端末装置42を使って行なう。そして編集追加が終わった時点で、会議録編集者端末装置42と会議サーバ60を再度接続して、音声及び画像記憶制御装置47の再生ボタンを押して編集内容を再生させ、会議端末制御装置44を介して会議サーバ60に編集後の会議録を送信し、マスタファイルとは別に記録する。

【0040】一方、後者の場合は、図8に示すように、もう1つ別の音声及び画像記憶装置46-2と音声及び画像記憶制御装置47-2を用意しておく。そうして音声及び画像記憶装置46-1に会議中に会議の内容をマスタファイルとして記録し、記録されている会議録を、音声及び画像記憶制御装置47-1を使ってもう一方の音声及び画像記憶装置46-2に読み出し、第2の音声及び画像記憶制御装置47-2の記録スタートボタンと記録ストップボタンを操作して必要なところを記録し直して編集する。会議録の編集記録を一応終了した後で、追加があれば、カメラ41-3、マイクロフォン41-1及び端末装置42を使って第2の音声及び画像記憶装置46-2内の編集後の会議録に追加する。





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【0041】この様な会議録の編集は音声及び画像記憶制御装置47、64に早送り早戻しの機能があれば速やかに実行できる。音声及び画像記憶装置46、63の制御は音声及び画像記憶制御装置47のボタンを手動で制御するほかに、会議録編集者端末装置42のコマンド入力画面42-5を使って実施することもできる。

【0042】図13に、会議録編集者端末装置42の編集画面の1例を示す。この編集画面には会議録編集時或いは会議録の再生時に会議録をモニタするモニタ画面42-3や音声及び画像記憶制御画面42-5が表示出10来る。音声及び画像記憶制御画面42-5の各機能はマウスを用いてクリックするなどの方法で起動できる。図14を参考にして、この発明による時間短縮の効果について示す。会議録は会議中の音声や画像を記録することで行なう。もし会議開催中の全時間について記録するとすると会議に費やした時間 $t_1$ と同じ時間の記録が必要になるが、会議録の記録を重要な部分とか結論の部分などに限れば会議録を簡潔にして、その分、時間を短くできる。これらの重要な部分や結論の部分の時間を $t_2 \cdot 1$ 、 $t_2 \cdot 2 \cdots t_2 \cdot n$ とすると会議録マスターファイルの記録時間は $t_3 = t_2 \cdot 1 + t_2 \cdot 2 + \cdots + t_2 \cdot n < t_1$ となる。さらに編集によってマスターファイルから必要な部分 $t_4 \cdot 1$ 、 $t_4 \cdot 2 \cdots t_4 \cdot n$ だけを取り上げたとなると、編集語の会議録記録長 $t_5$ は $t_5 = t_4 \cdot 1 + t_4 \cdot 2 + \cdots + t_4 \cdot n < t_3$ で一層時間を縮めることができる。これに更に会議録編集者が追加記録を $t_6$ 時間行なったとして最終的な会議録の長さ $t_7$ は $t_7 = t_5 + t_6$ になる。

【0043】編集時の記録の再生を、出来るだけ早送り、早戻しで行なうことで、ここでの時間ロスは短くで30きる。そうして編集後の会議録が簡潔になっていればそれだけ会議参加者が配布した会議録を読む場合も短時間ですみ、会議のポイントや結論を明確にできる。会議録編集に要する時間 $t_{10}$ は、会議録マスターファイルの再生時間 $t_8$ と、編集された会議録を再生してチェックする時間 $t_9$ と、会議録編集者の追加記録 $t_6$ の和となり、編集時の記録の再生を早送りで行なうことで短縮できる。

【0044】会議録を受信する端末にも音声及び画像記憶装置46や音声及び画像記憶制御装置47を具備させ40れば、受信者が会議録をさらに早送りして読め、不要なところは読み飛ばし、見たいところだけを抽出してゆっくり見ることができる。

【0045】遠隔会議システムの接続構成の一例を図15に示す。会議端末40にはパネラ会議端末40-1～40-4とフロア会議端末40-5～40-8の2つの種類がある。パネラ会議端末40-1～40-4は会議サーバ60と常時、マルチメディアの双方向の接続301～304で接続されており、音声、動画像、データ等を送受信することができる。パネラ会議端末4\*50

\*0-1～40-4の使用者がパネラ参加者で会議中に常時発言が可能で、その姿は分割された画面42-3上に通常表示されている。会議編集者の会議端末はこのパネラ会議端末40-1～40-4でなくては成らない。フロア会議端末40-5～40-8は会議サーバ60と下り片方向同報のマルチメディアコネクション310で常時接続されており、音声と動画像を受信して会議の内容を見聞きすることができる。この片方向のコネクション310のほかに双方向のコネクション320も用意されており、必要に応じてこの双方向のコネクション320を会議サーバ60とフロア会議端末40-5～40-8の間に張り、データ、音声、動画を送受信できる。これによりフロア参加者のフロア会議端末40-5～40-8からフロア参加者の発言の音声が発言者の映像と共に会議サーバ60を経てパネラ参加者や司会者に送信できる。ただしフロア会議端末40-5～40-8の使用者が画面に登場できるのは発言中だけである。

【0046】

【発明の効果】以上説明したように、本発明によれば、マルチメディア情報を扱う会議端末を通信網により接続して分散会議システムを構成し、マルチメディア会議録を実現するために会議中の音声と映像を記録するための音声および映像記録装置と音声と映像の記録の開始と終了などの指示を行なう音声および映像記録制御装置を設けるようにしたので、会議参加者は自席で会議に参加することができ、会議録編集者も自席で会議録を作成することができる。

【0047】またマルチメディアを記録する方式で会議録を作成するので、会議録の作成、編集が容易で短時間にできるため、会議後の会議録編集に割かれる時間を短くでき、会議録の承認、会議録の配布を、会議終了後時間を置かずに行なうことができる。また会議録は会議録サーバに転送しておいて、端末から何時でも簡単に参照することができる。

【図面の簡単な説明】

【図1】本発明が実施される分散会議システムの基本構成。

【図2】本発明が実施される分散会議システムの会議サーバの構成。

【図3】本発明が実施される分散会議システムのサービス制御システムの構成。

【図4】本発明の実施例の会議端末の構成。

【図5】本発明の実施例の会議録編集装置の構成。

【図6】本発明が実施される会議端末での画面の表示例。

【図7】本発明の実施例の音声及び画像記憶制御装置のスイッチパネルの1例。

【図8】本発明の実施例の会議録編集装置の他の構成。

【図9】本発明が実施される会議端末の会議端末制御装置の構成。

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【図10】本発明の実施例の端末装置各ウィンドウ上のマルチメディア会議録の表示例。

【図11】本発明の実施例の端末装置各ウィンドウ上のマルチメディア会議録の他の表示例。

【図12】本発明の実施例の端末装置各ウィンドウ上のマルチメディア会議録の他の表示例。

【図13】本発明の実施例の会議録編集装置の端末装置上の会議録編集画面の1例。

【図14】本発明の実施例に於ける時間短縮効果の説明図。

【図15】本発明が実施される分散会議システムでの会議端末の接続構成の1例。

【図16】従来の遠隔会議システムの構成。

【符号の説明】

40 会議端末

\*41-1 マイクロフォン

41-2 スピーカ

41-3 カメラ

41-5 デジタイザ

41-6 ファクシミリ

42 端末装置

44 会議端末制御装置

45 会議録編集装置

46、63 音声及び画像記録装置

10 47、64 音声及び画像記録制御装置

60 会議サーバ

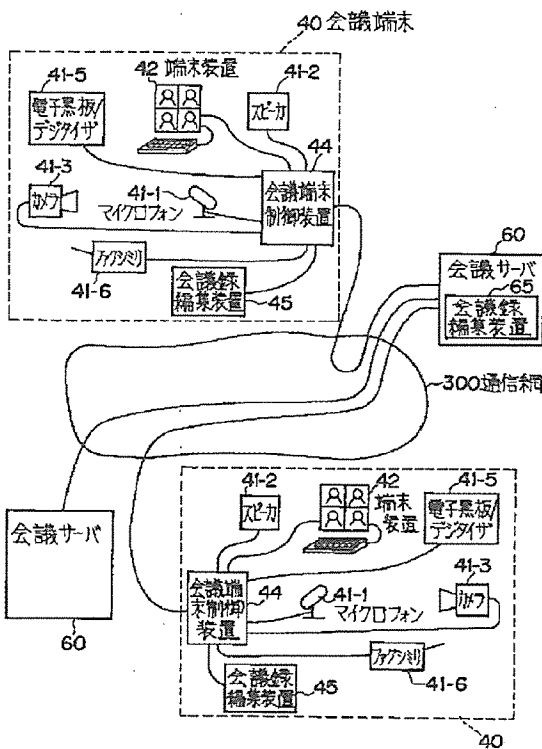
61 サービス制御システム

62 状態監視端末

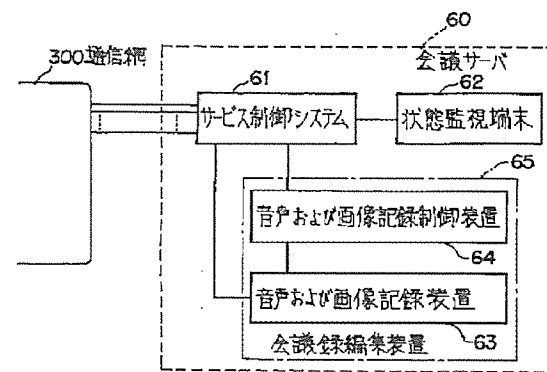
回線 L1~Ln

\* モジュール M1~Mn

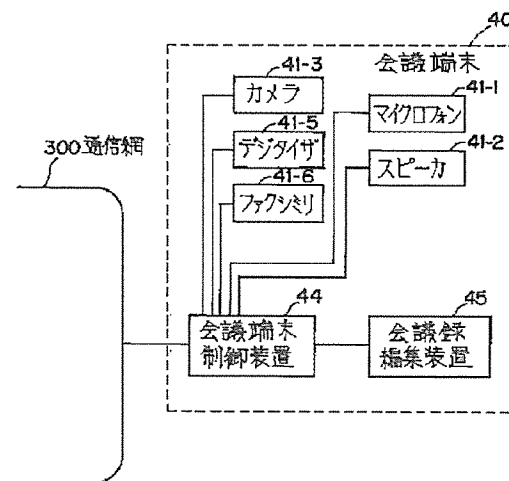
【図1】



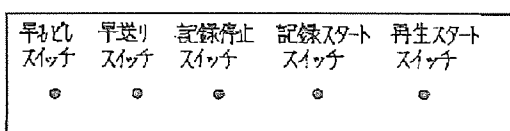
【図2】



【図4】



【図7】



音声および画像記録制御装置のスイッチの一例

013

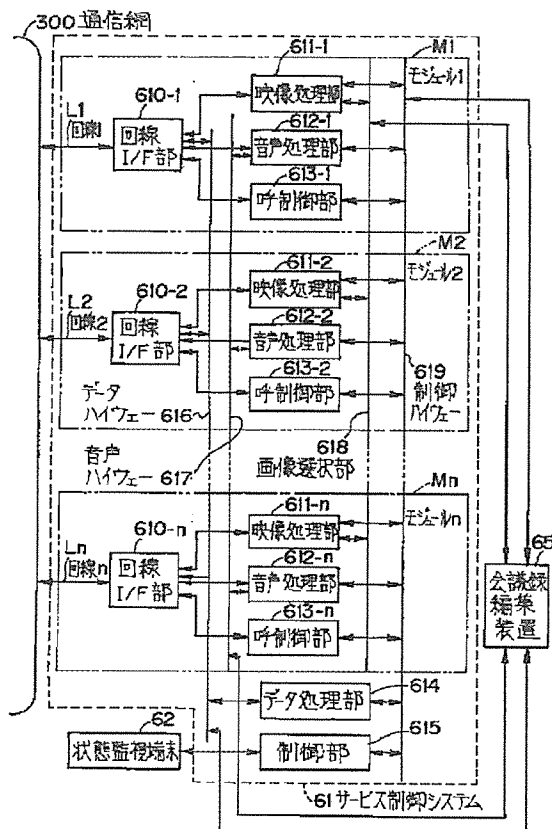


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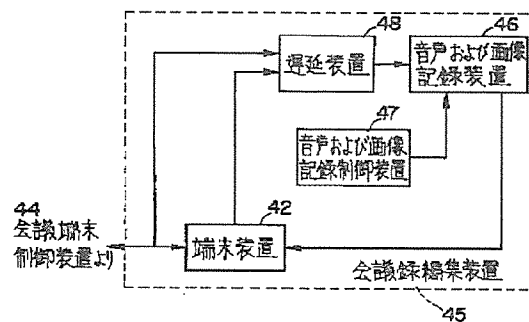
特開平7-123384

023

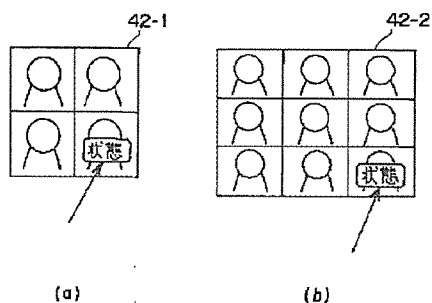
【図3】



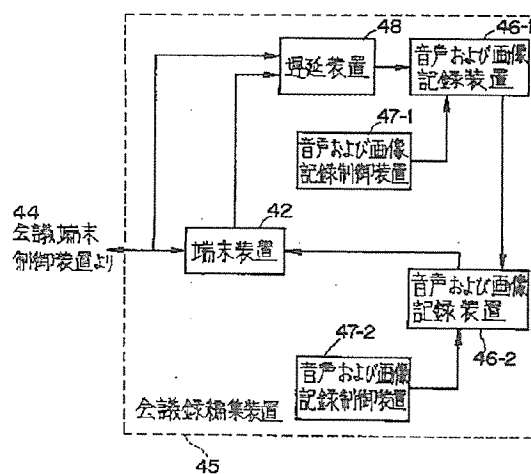
【図5】



【図6】



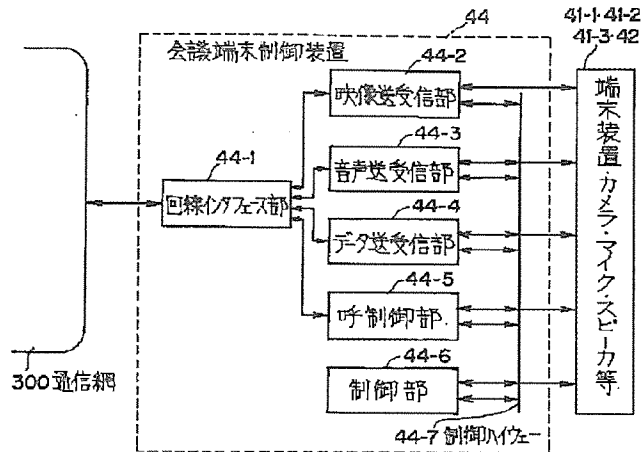
【図8】



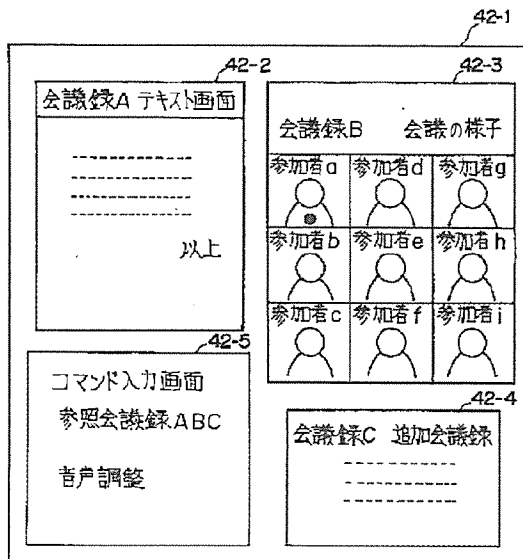
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特開平7-123384

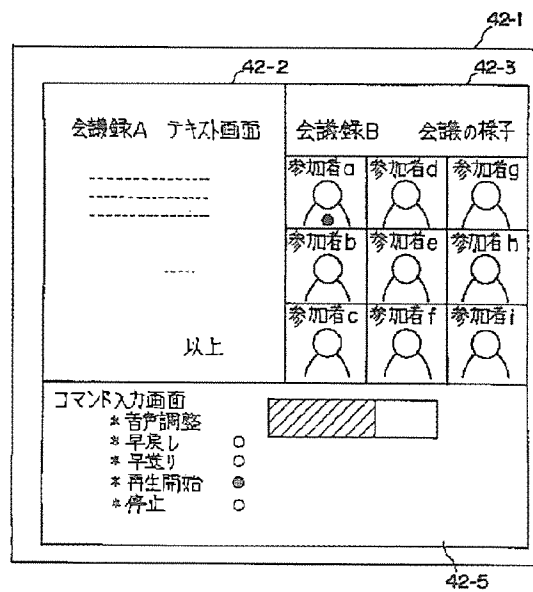
【図9】



【図10】



【図11】



033

(10)

特開平 7-123384

【図 1 2】

42-1

会議録表示メニュー

会議録リスト ●  
会議の様子 ●  
追加資料 ○

マルチメディア会議録

会議開催日 □年□月□日 △曜日  
会議開催場所 ◇◇◇◇  
参加者 ○○○○○○○○○○○○  
会議録配布台 □□□□□□□□□□□□

主な議論

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-----  
-----

結論

-----  
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-----

以上

参加者a	参加者d	参加者g
参加者b	参加者e	参加者h
参加者c	参加者f	参加者i

【図 1 3】

42-1

42-5

音/および画像記憶装置制御画面

早戻し ○  
早送り ○  
停止 ○  
記録開始 ○  
再生開始 ○  
音声レベル

42-3

会議録編集モニタ画面

参加者d	参加者d	参加者g
参加者b	参加者e	参加者h
参加者c	参加者f	参加者i

【図 1 4】

a) 会議録の記録時間

会議に費した時間  $t_1$ 会議中に記録した時間  $t_2$ 

会議録マスターファイル記録時間

 $t_3 = t_{2-1} + t_{2-2} + \dots + t_{2-n}$ 編集で取り上げた時間  $t_4$ 

編集した会議録記録長

 $t_5 = t_{4-1} + t_{4-2} + \dots + t_{4-n}$ 会議録編集者の追加記録時間  $t_6$ 

最終会議録の記録時間

 $t_7 = t_5 + t_6$ 

b) 会議録編集に費した時間

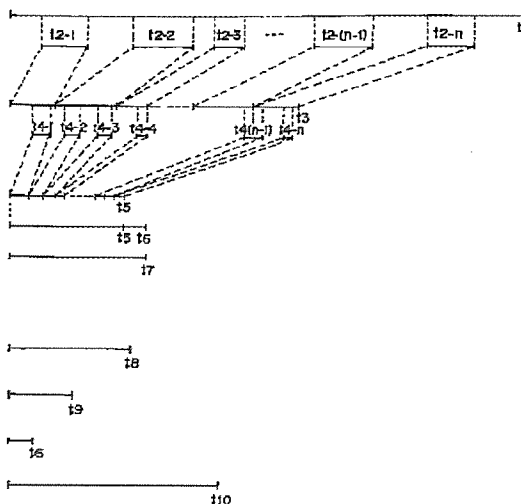
会議録マスターファイル再生時間

(早送り)  $t_8 < t_3$ 

編集後チェック時間

(早送り)  $t_9 < t_5$ 会議録編集者の追加記録時間  $t_6$ 

会議録編集に要した時間

 $t_{10} = t_6 + t_8 + t_9$ 

043

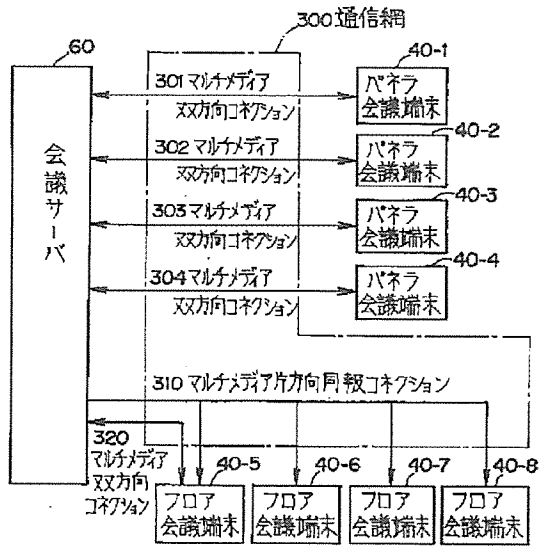


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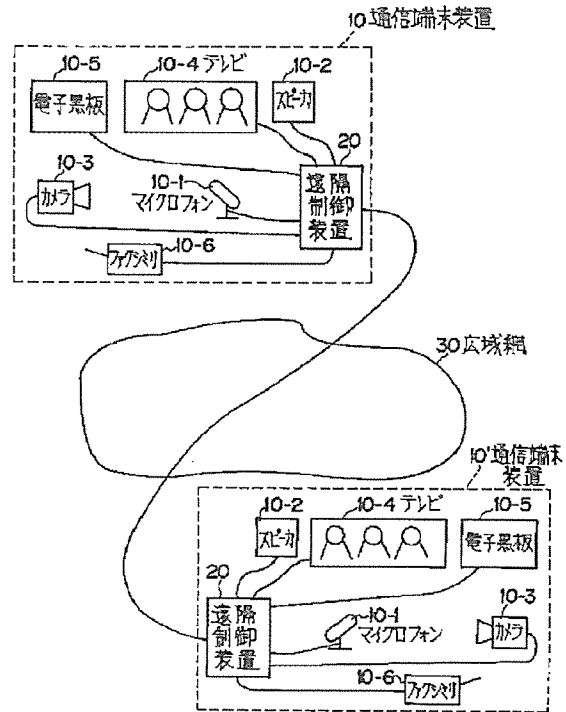
特開平 7-123384

053

【図15】



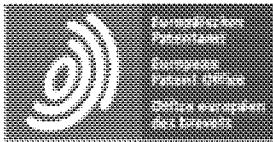
【図16】



フロントページの続き

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## Notice

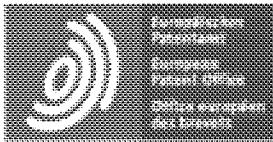
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## ABSTRACT CN101009806A

[1]

13 A video conference system includes a touch screen device and a video conference unit. A display device displays video data for a video conference and generates touch data based on user selections relative to the touch screen. For example, a videoconferencing unit is operably coupled to the touch screen device through a video connection and a data interface connection. The units establish and conduct video conferences with one or more endpoints over the network. The unit sends video data to a display device and receives touch data from the device. The received touch data is used to control the operation of the video conferencing system. Received touch data can be used to initiate video conference calls, change operating parameters, change camera orientation, initiate picture-in-picture displays, access menus, access memory, change video data sources, initiate whiteboard displays, and access connected devices screen.





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## Notice

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## DESCRIPTION CN101009806A

*10* System and method for controlling a video conference using a touch screen interface

[0001]

*14* technical field

[0002]

*18* The subject matter of the present disclosure relates to a system and method for controlling a video conference using a touch screen interface.

[0003]

*23* Background technique

[0004]

*27* Typically, a user of a videoconferencing system uses a remote control to operate and control the system.

*28* Additionally, a control panel, tablet input device, keypad, or network interface may be used to operate and control the system. When using a handheld remote control, the user aims the remote control at the videoconferencing system and navigates through the many selections and menus of the user interface to operate and control the system. Typically, the tablet input device and keyboard must be properly connected to the videoconferencing system, which may be difficult for the user. For video conferences, users also want to set up a document camera or computer with annotation tools to enable users to add recordings and annotations to the video conference. Unfortunately, document cameras and computers with annotation tools can be difficult to set up and use with videoconferencing systems.



[0005]

39 One prior art videoconferencing system known in the art is available from Polycom.

40 3000iPower acquired by Inc. 3000iPower includes Polycom iPower 9800 and SMART Technology's Rear Projection SMART Board™ 3000i interactive whiteboard. The iPower9800 has a PC-based design, thereby essentially operating as a computer. 3000iPower allows projection and viewing of computer images in a video conferencing phone, and the 3000iPower provides touchscreen controls for accessing conferencing applications. Users can use the pens on the 3000iPower's pen tray to take notes on the whiteboard to highlight important information.

[0006]

49 The presently disclosed subject matter is intended to overcome, or at least reduce, the effects of one or more of the problems raised above.

[0007]

54 SUMMARY OF THE INVENTION

[0008]

58 The video conference system includes a touch screen display device and a video conference unit.

59 The display device displays video data for the video conference and generates touch data based on user selections relative to the touch screen.

61 The videoconferencing unit is operatively coupled with the touch screen device through, for example, a video connection and a data interface connection.

63 The unit establishes and conducts video conferences with one or more endpoints over the network.

64 The unit sends video data to the display device and receives touch data from the device.

65 The received touch data is used to control the operation of the video conferencing system.

66 Received touch data can be used to initiate video conference calls, change operating parameters, change camera orientation, initiate picture-in-picture displays, access menus, access memory, change video data sources, initiate whiteboard displays, and access connected devices' Screen.

[0009]

72 The foregoing summary is not intended to summarize every possible embodiment, or every aspect of the present disclosure.

[0010]

77 Description of drawings

[0011]

81 The foregoing summary, preferred embodiments, and other aspects of the disclosed subject matter will be best understood by reference to the detailed description of specific embodiments taken in conjunction with the accompanying drawings, in which:

[0012]

87 FIG. 1 illustrates an embodiment of a videoconferencing system according to specific instructions of the present disclosure.

[0013]

92 Figure 2A shows a schematic diagram of an embodiment of a videoconferencing system.

[0014]

98 Figure 2B shows a schematic diagram of another embodiment of a videoconferencing system.

[0015]

100 Figure 3 schematically shows the components of the videoconferencing unit.

[0016]

104 FIG. 4 shows an embodiment of a control panel of a touch screen display device.

[0017]

108 FIG. 5 shows an embodiment of a menu function of a video conferencing system.

[0018]

112 Figure 6 shows an embodiment of the videoconferencing system camera functionality.

[0019]

116 Figure 7 shows an embodiment of the annotation function of a video conferencing system.

[0020]

120 Figure 8 shows an embodiment of the whiteboard functionality of a videoconferencing system.

[0021]

124 While the disclosed subject matter is capable of various modifications and alternative forms, specific  
embodiments of the disclosed subject matter are shown by way of example in the drawings and are described  
in detail.  
127 The drawings and written description are not intended to limit the scope of the inventive concept in any way.  
128 Rather, as required by 35 U.S.C. § 112, the drawings and written description are provided to illustrate the  
inventive concept to those skilled in the art by reference to specific examples.

[0022]

133 detailed description

[0023]

137 Referring to FIG. 1, an embodiment of a videoconferencing system 10 according to specific instructions of the  
present disclosure is shown.  
139 The video system 10 includes a video conference unit 100 and a touch screen display device 200 .  
140 The videoconferencing system 10 may also include one or more peripheral devices, such as a computer  
(laptop or desktop) 50 , a video cassette recorder (VCR) 70 , and a digital versatile disk (DVD) player 80 .  
142 In one embodiment, the videoconferencing unit 100 is available from Polycom.  
143 The VSX 8000 available from Inc, the assignee of the present disclosure, and the touch screen display device  
200 are the 3000i model SMARTBoard available from SMART Technologies of Canada.  
145 In an alternative embodiment, the videoconferencing unit 100 and the touch screen display device 200 may be  
integrated together for the videoconferencing system 10 .

[0024]

150 The video conference unit 100 is used to establish and conduct video conferences with remote endpoints (not  
shown) over a network.  
152 The videoconferencing unit 100 has a camera 102 and a microphone 104 .  
153 Depending on the implementation, the unit 100 may have other common components, such as an infrared  
(IR) detector 106 .  
155 The touch screen display device 200 is capable of both displaying video to the user and receiving touches and  
annotations from the user.  
157 In one embodiment, touch screen display device 200 is a video monitor or the like with a light sensor  
surrounding screen 202 for detecting when a user touches, or writes on, an area of screen 202 .  
159 For example, the video monitor may be part of a conventional television display, flat panel display, or other  
display known in the art.  
161 The touch screen display device 200 may also use other touch screen technologies known in the art.

[0025]

165 As a 3000i model SMARTBoard, device 200 includes projection screen 202, integrated extended graphics array (XGA) projector 220, control panel 230, and tray 240.

167 Device 200 also includes an audio system (not shown).

168 To detect when the user touches the screen, the device 200 uses a digital camera (not shown) to detect objects and movement relative to the display screen 202 .

170 As discussed below, the control panel 230 of the display device 200 includes buttons configured to operate in conjunction with the videoconferencing unit 100 .

172 Tray 240 has various tools 242, such as pens and erasers.

173 A light sensor (not shown) on the tray 140 is used to detect when the user picks up a particular pen or eraser tool 242 from the tray 140 .

[0026]

178 2A and 2B, a schematic diagram of the embodiment of the video conferencing system 10 of FIG. 1 is shown.

179 In the embodiment of FIG. 2A , the videoconferencing unit 100 of the system 10 is directly coupled to the touch screen display device 200 .

181 Subsequent discussions focus on video conferencing system 10 video connections.

182 However, it will be appreciated that the videoconferencing system 10 may have an audio connection.

183 For example, the videoconferencing unit 100 may have an audio connection with the display device 200 and may transmit audio data to speakers of the display device 200 .

[0027]

188 For the video connection of the system 10, the camera 102 is coupled to the input 114 of the unit 100, eg, an S-video connection.

190 Videoconferencing unit 100 has video output 112 coupled to video input 212 of display device 200 .

191 For example, an XGA cable may be used to connect the XGA output 112 of the unit 100 with the RGB input 212 of the display device 200 .

193 The videoconferencing unit 100 also has a serial port 113 coupled to the serial port ( COM1 ) 213 of the display device 200 .

195 Unit 100 and display device 200 use serial ports 113 and 213 to transfer data between each other.

196 This data includes touch data obtained by the display device 200 and transmitted to the unit 100, which uses the touch data for the operations discussed below.

198 The transmitted data also includes data generated by a user selecting a button configured on a control panel (not shown) of the display device 200 .

[0028]

203 Videoconferencing system 10 may also include a number of optional components that may be used with some implementations or functions of system 10 .

205 For example, one or more optional VCR or DVD players 70 or 80 may be coupled to one or more inputs 118

of unit 100 .

207 Additionally, an optional laptop or other computer 50 may be coupled to touch screen device 200 through  
serial port (COM2) 215 .

208 The coupling of the computer 50 to the serial port (COM2) 215 of the device 200 may allow the display device  
200 to operate as a stand-alone component, separate from the videoconferencing unit 100, if the computer 50  
has appropriate software.

[0029]

215 The computer 50 may also be coupled to an extended graphics array (XGA) splitter 60 , which is coupled to  
the input 116 of the videoconferencing unit 100 and to the RGB input 216 of the display device 200 .

217 The coupling of computer 50 and splitter 60 to unit 100 and device 200 allows computer 50 to provide  
content, images on the computer to be displayed by device 200, processed by videoconferencing unit 100 and  
forwarded to a remote endpoint (not shown) Wait.

220 In one embodiment, the computer 50 may have a graphical user interface for controlling the operation of the  
videoconferencing unit 100 if the computer 50 has appropriate software to integrate the computer 50 with the  
unit 100 .

223 A GUI for controlling the unit 100 using the computer 50 may be displayed on the display device 200 when  
operating in the "PC indication" mode of operation discussed below.

[0030]

228 In the embodiment of the videoconferencing system 10 in FIG. 2B , the videoconferencing unit 100 again has  
a video output 112 coupled directly to the RGB input 212 of the display device 200 .

230 However, the serial port 113 of the unit 100 is coupled to the A/V controller 150 , which is coupled to the  
serial port ( COM1 ) 213 of the display device 200 .

232 Using A/V controller 150, unit 100 and device 200 can use serial ports 113 and 213 to transfer data between  
each other.

[0031]

237 In one embodiment, A/V controller 150 is a POINTMAKER(R) PVI video marker, which is a programmable  
device for controlling audio and video equipment and is available from Boeckeler Instruments. of Tucson,  
Arizona.

240 Inc obtained.

241 The serial connection of the videoconferencing unit 100 to the A/V controller 150 via the serial port 113  
allows the unit 100 to control the operation of the A/V controller 150 .

[0032]

246 The camera 102 is coupled directly to the camera input 114 of the unit 100 as described in the previous  
embodiment.

248 However, optional components such as VCR/DVD 70/80, document camera 90, computer 50, and XGA  
splitter 60 are coupled to A/V controller 150.  
250 A/V controller 150 provides first video data 152 from personal computer 50, second video data 154 from  
VCR/DVD 70/80, and video data from document camera 90 to one or more inputs 115 of  
videoconferencing unit 100 Third video data 156 .

[0033]

256 In this embodiment, the document camera 90 may be connected to the S-video input of the A/V controller  
150 through an S-video cable.  
258 The S-video cable from the S-video input of the A/V controller 150 can be connected to the second camera  
input of the unit 100 .  
260 The VCR/DVD70/80 can be connected to the composite video input of the A/V controller 150 via an RCA  
or BNC cable from the composite video output of the VCR/DVD 70/80.  
262 A BNC or S-video cable from the composite video output of the A/V controller 150 can be connected to the  
VCR/DVD video input of the videoconferencing unit 100 .  
264 The video from the A/V controller 150 can be connected to the VGA input of the video conferencing unit  
100 through an XGA/VGA cable from the VGA output of the A/V controller 150 .

[0034]

269 3, additional components of the videoconferencing system 10 are schematically shown in greater detail.  
270 The videoconferencing unit 100 has a controller 120, which may include any conventional encoders,  
processors, and other electronic components known in the art and used in videoconferencing units.  
272 The controller 120 is coupled to the video output 112, the serial port 113 of the data interface, and the  
memory 130 of the storage functions 131-135.  
274 Controller 120 is also coupled to input 114 for video from near camera 102 and may be coupled to interface  
115 to control near camera 102 .  
276 Video output 112 is coupled to video input 212 of display device 200 , and serial port 113 exchanges data with  
serial port 213 of display device 200 .  
278 For example, the serial port 113 receives touch data from the display device 200 , and the serial port 113 can  
exchange control data with the display device 200 .

[0035]

283 The controller 120 includes a video codec 122 and a data processor 124 .  
284 Video codec 112 is responsible for processing video data to be displayed by display device 200 and sent to the  
videoconferencing endpoint.  
286 Typically, video data may include images captured by a camera (not shown) of unit 100, video from a remote  
endpoint of a video conference, content from peripheral devices (eg, VCRs, DVD players, computers,  
document cameras, etc.), Annotations from display device 200, and other visual data.  
288 The operation of such a video codec 122 in a videoconferencing environment is well known in the art and will

not be described here.

[0036]

294 The data processor 124 is responsible for processing the data of the videoconferencing unit 100 .

295 The data includes touch data, communication data, commands, video conference information, and the like from the display device 200 .

297 The controller 120 is also coupled to a network interface 140 (eg, commonly used with videoconferencing units), and the network interface 150 is coupled to a videoconferencing network 142 as known in the art.

[0037]

302 Controller 120 uses operational functions 131 - 135 stored in memory 130 to control the operation of at least some features of videoconferencing system 10 .

304 These operational functions include an on-screen graphical user interface (GUI) function 131 , a camera function 132 , an annotation function 133 , a whiteboard function 134 , and an auxiliary device function 135 .

306 Each of these operational functions 131-135 is discussed in greater detail later, but a general overview of these functions 131-135 is provided here.

[0038]

311 The on-screen GUI function 131 allows the videoconferencing unit 100 to display a graphical user interface on the display device 200 for controlling the operation of the system 10 .

313 The graphical user interface of videoconferencing unit 100 may include a number of touch controls, menus, and dialogs that may be displayed on display device 200 for a user to operate and control system 10 .

315 For example, the graphical user interface of unit 100 may allow the user to make video conference calls through a directory, speed dial, or manual dial menu; answer incoming video conference calls; hang up video conference calls; mute or change audio Volume; select cameras and content sources, swap near and far video in picture-in-picture (PIP), and other operations disclosed here.

[0039]

322 Camera functionality 132 allows videoconferencing unit 100 to display visual touch controls on display device 200 to control the operation of one or more cameras (eg, near-end cameras 102).

324 In one embodiment, the near-end camera 102 is a pan-tilt-zoom camera capable of pan, tilt and zoom.

325 One or more of the pan, tilt and zoom capabilities of the near-end camera 102 may be achieved by one or more mechanical actuators 103 as used in the art to operate pan-tilt-zoom cameras of videoconferencing units.

328 Interface 115 is coupled to actuator 103 and controller 120 uses control signals through interface 115 to control the operation of the pan, tilt and zoom capabilities of near-end camera 102 .

330 A user utilizing visual touch controls on the display device 200 may generate control signals to control the pan, tilt and zoom of the near-end camera 102 .



[0040]

335 Optionally, the pan, tilt and zoom capabilities of the near-end camera 102 may be obtained electronically.

336 For example, near-end camera 102 may have processing capabilities for pan, tilt, and zoom, and controller  
120 may use control signals through interface 115 to control this processing.

338 In another example, controller 120 may instead have processing capabilities for pan, tilt, and zoom, and  
controller 120 may perform those operations based on video received from near-end camera 102 via video  
input 114 .

[0041]

344 In addition to controlling the near-end camera 102 , the camera function 132 allows the videoconferencing  
unit 100 to display visual touch controls on the display device 200 for controlling the operation of the far-end  
camera 114 on the network 142 .

347 For example, far end camera 144 may be associated with a remote endpoint participating in a video  
conference.

349 Using the network interface 140 , the controller can use the control signals to control the pan, tilt and zoom  
capabilities of the far end camera 144 .

351 For example, far end camera 144 may be a pan-tilt-zoom camera with one or more mechanical actuators, or  
with electronic processing capabilities.

353 The controller 120 may control the far-end camera 144 through the network interface 140 using a far-end  
camera control protocol (eg, H.224 described in Appendix Q of H.323).

[0042]

358 The annotation function 133 allows the user to annotate the video displayed on the display device 200 , and  
the whiteboard function 134 allows the user to annotate on the whiteboard displayed on the display device  
200 .

361 Finally, auxiliary device functionality 135 allows videoconferencing unit 100 to display video from other  
auxiliary devices such as computers, laptops, VCRs, DVD players, and the like.

[0043]

366 As will be apparent from the general description above, the operating functions 131-135 allow the  
videoconferencing unit 100 to operate the touch screen display device 200 in the annotation mode and in the  
touch control mode.

369 The determination of the mode may depend on whether the pen or eraser tool 242 is picked up from the tray  
240 of the display device 200 .

371 For example, if the pen or eraser tool 242 is picked up from the tray, the videoconferencing unit 100 can  
operate the display device 200 in an annotation mode so that a user can annotate on the video displayed on  
the device 200 .



374 The video may be a video conference or other content, and may come from the video conference unit 100, a computer, a laptop, a VCR, a DVD player, a document camera, or the like.  
376 When all of the tools 242 are placed in the tray 240, the videoconferencing unit 100 can operate the display device 200 in a touch control mode so that a user can interact with the graphical user interface, touch controls, menus, dialogs, etc. of the unit 100 by touch. The corresponding display 200 area is used to control the operation of the video system 10.

[0044]

382 Having provided a general overview of how videoconferencing unit 100 controls the operation of videoconferencing system 10, reference is now made to Figures 4-8 for a more detailed discussion of the operational functions of videoconferencing unit 100.

[0045]

389 As described above, the videoconferencing unit 100 uses the auxiliary device function 135 to control the operation of the touch screen display device 200.  
391 One way of implementing the control is by integrating the control on the control panel (230; Fig. 1) of the display device 200 with the videoconferencing unit 100.  
393 4, an embodiment of a control panel 230 of a touch screen display device (not shown) is shown.  
394 As previously discussed, preferably the touch screen display device is a 3000i model SMARTBoard.  
395 Likewise, the control panel 230 of the 3000i model SMART Board has buttons configured to control the volume level, brightness level and contrast level of the display device.  
397 However, as part of the integration between the videoconferencing unit and the display device of the disclosed videoconferencing system, as shown in the embodiment of FIG. 4, the buttons on the control panel 230 of the display device (for convenience, in FIG. 4, also refer to the reference numerals of the components in FIG. 1 of the present disclosure).

[0046]

404 The control panel 230 includes a first button 231 configured to initiate a video conference mode of operation.  
405 In this mode, the videoconferencing unit (100) establishes a videoconferencing connection with a remote endpoint via the network, sends the video of the videoconference to the RGB input of the display device (200), and communicates between the display device (200) and the unit (200). 100) to transfer graphical user interface and touch data, establish and conduct video conferences.

[0047]

412 The second button 232 of the panel 230 is configured to initiate control of the personal computer (50) if the personal computer (50) is coupled to the disclosed videoconferencing system.  
414 In this mode, content from the computer (50) can be shown during the video conference.  
415 The content may include the computer's screen, video or other images stored on the computer, PowerPoint

presentations, documents, and the like.

417 During the video conference, the content from the computer (50) is processed by the video conference unit (10) and sent to the display device (200).

419 The content can also be sent to the remote endpoint of the video conference.

[0048]

423 The third button 233 of the panel 230 is configured to initiate the PC indication mode of operation.

424 In this mode, the video data from the computer (50) is sent directly from the XGA output of the splitter (60) to the RGB input of the display device (200), not from the video codec of the videoconferencing unit (100). send.

427 This can be done whether or not in a video conference call, or whether or not computer content is being sent to other endpoints.

429 The fourth button 234 of the panel 230 is configured to initiate a video mode of operation in which the display device (200) operates to receive video from the connected source over the S-video connection.

[0049]

434 In addition to the buttons on the control panel 230, the display device (200) also includes other buttons 235 and 236 on the device tray (240).

436 For convenience, these buttons 235 and 236 are shown in FIG. 4 separately from the tray (240).

437 The first tray button 235 is initially configured to access an on-screen keyboard on the display device (200) screen when the display device (200) is operated with the software of the coupled computer or laptop computer.

440 However, for the videoconferencing system (10) of the present disclosure, pressing this keyboard button 235 is reconfigured for: if all pens (242) on the tray (240) of the display device (200) are dropped, and if the unit (100) ) generates the appropriate screen for displaying the keyboard, then accesses the on-screen keyboard of the videoconferencing unit (100).

444 However, if the pen (242) is picked up from the tray (240), the button 235 is configured to: access if the A/V controller (150; FIG. 2A) is a component of an embodiment of the videoconferencing system (10). Calibration screen of the A/V controller (150; Figure 2A).

447 With the menu screen accessed, the user can use the touch screen display device (200) to calibrate the A/V controller (150; Figure 2A).

[0050]

452 The second tray button 236 is initially configured to operate as a right mouse click when operating the display device (200) with the software of the coupled computer or laptop (50).

454 However, for the videoconferencing system (10) of the present disclosure, pressing the button 236 is reconfigured to start and stop the videoconferencing unit if the pen (242) on the tray (240) of the display device (200) is dropped (100) VGA graphics.

457 If the pen (242) is picked up from the tray (240), the button 236 is configured to: access the A/V controller

(150; Figure 2B) if it is part of an implementation; Figure 2B) menu.

459 With the menu screen accessed, the user can use the touch screen display device (200) to control the operation of the A/V controller (150; Figure 2B).

[0051]

464 Returning briefly to FIG. 3, as previously discussed, the videoconferencing unit 100 has on-screen GUI functionality 131 to display user interfaces, menus, touch controls, dialogs, etc. on the display device 200 used to control the operation of the system 10.

467 Part of the on-screen GUI functionality 131 includes displaying touch controls on the display device 200 and, for those touch controls, receiving touch data from the display device 200 at the videoconferencing unit 100 to control the operation of the system 10.

470 In other words, the display device 200 is used to detect information, selections, annotations from user touches, electronic pens, etc. on the touch screen display device 200.

472 The detected touch data is sent to the video conference unit 100.

473 The touch data is used to operate the videoconferencing system 10.

[0052]

477 For example, a touch or release in a touch screen area of display device 200 causes an event corresponding to a touch and/or release of a user interface feature configured for videoconferencing unit 100.

479 If the user's touch is on an area of the screen not designated as a touch control of the user interface of the unit 100, the touch data may be processed by a supervisory algorithm that can access camera controls or bring up a main menu, or the like.

482 Accordingly, the unit 100 determines whether a graphical user interface (GUI) and/or video is currently displayed on the display device 200.

484 For example, if the unit 100 is displaying a GUI, the user will be able to use a finger or electronic pen 242 to touch the screen of the display device 200 and generate input to the videoconferencing unit 100.

[0053]

489 Referring to Figure 5, an embodiment of a menu 310 generated by the videoconferencing unit (100) is shown on the touch screen 202 of the display device (200).

491 The menu 310 may be invoked when the user selects the button 302 displayed on the upper left corner of the screen 202 while the video is being displayed.

493 Preferably, the button 302 is transparent or hidden and available from all screens of those videos including those of the participants and content.

495 Once the menu 310 is invoked, the menu 310 allows the user to control the videoconferencing system by using interactive touch directly on the screen 202.

497 Preferably, menu 310 is transparent and displayed over the video currently displayed on screen 202.

[0054]

501 Menu 310 includes a number of touch controls 312 similar to buttons available on a remote control.

502 These touch controls 312 include a Home button, a Call button, a hang up button, a volume button, a mute button, a camera button, a picture-in-picture (PIP) button, a near-end button, a far-end button, a preset button, and close button.

505 These and other buttons may be provided in menu 310 depending on the implementation.

506 For example, some other possible buttons include buttons for eliciting help and buttons for on-screen keyboards.

[0055]

511 Touch controls 312 may operate similarly to corresponding controls found on an actual remote control.

512 Here, the difference is that the designated areas of video data displayed on screen 202 are associated with touch controls for controlling and operating the video system.

514 For example, selecting the call button on menu 310 may initiate a video conference call.

515 To initiate a call, a speed dial dialog or an address book dialog can be accessed on screen 202 to select which remote endpoint to establish a video conference with.

517 Selecting the hang up button on menu 310 can end the video conference call, or, if there is more than one currently active call, can lead to a hang up dialog on screen 202.

519 Selecting the volume button on menu 310 can bring up a volume bar on screen 202, and the user can then touch the volume bar displayed on screen 202 to control the volume.

521 Mute and PIP on menu 310 may be toggle buttons for muting audio and producing picture-in-picture on screen 202 .

[0056]

526 Selecting the presets button on menu 310 can bring up a presets dialog on screen 202, and the user can select from a number of stored presets, or touch and hold to store presets.

528 Selecting the camera button on menu 310 can bring up a dialog on screen 202 that lists video sources (eg, cameras, computers, etc.) and the user can touch the appropriate button on the list to select the desired video source.

531 The near-end and far-end buttons on menu 310 allow the user to select and control the near-end camera (ie, the camera coupled to the videoconferencing unit (100)), or one or more of the far-end cameras associated with the endpoints of the videoconference .

[0057]

537 As previously discussed, the videoconferencing unit 100 of FIG. 3 also has a camera function 132 for controlling the camera.

539 Part of the camera functionality 132 includes displaying camera controls on the display device 200 and receiving touch data from the user relative to those camera controls to control camera operation.

541 Referring to Figure 6, an embodiment of the camera controls 350 generated by the videoconferencing unit is

shown on the touch screen 202 of the display device.

543 Camera controls 350 allow the user to control the pan-tilt-zoom camera using intuitive touch on screen 202 .  
544 When a full screen video is being displayed on the screen 202, touching anywhere on the screen when the pen  
or eraser tool (242; FIG. 1) is down will bring up the watermark grid 360 displayed over the active video.  
546 Control icons 364 and 368 are located in areas 362 and 366 of the watermark grid 360 .  
547 By touching a pair of upper and lower areas 362 of grid 360 associated with control icons 364, the user can  
pan-tilt-zoom a connected videoconferencing unit's pan-tilt-zoom camera, or a remote endpoint  
participating in a videoconference. The camera is tilted.  
550 By touching a pair of left and right areas 363 of grid 360 associated with control icons 365, the user can pan-  
tilt-zoom a connected videoconferencing unit's pan-tilt-zoom camera, or a remote endpoint participating in  
a videoconference. The camera pans.  
553 By touching a pair of interior areas 366 of grid 360 associated with other control icons 368, the user can zoom  
the camera of a connected videoconferencing unit, or a camera of a remote endpoint participating in a  
videoconference.

[0058]

559 Depending on which video is currently being displayed on screen 202, which camera (eg, near end or far end)  
associated with the video conference is controlled is determined.  
561 For example, if the video of the far end camera associated with the videoconferencing endpoint is currently  
being displayed on the screen, touching areas 362, 363 and 366 associated with grid 360 will control the  
panning of the far end camera using the techniques disclosed herein Lens, tilt and zoom.  
564 If the near-end camera video connected to the videoconferencing unit associated with screen 202 is currently  
being displayed, touching areas 362, 363 and 366 associated with grid 360 will control the panning of the  
near-end camera using the techniques disclosed herein , tilt and zoom.

[0059]

570 As previously discussed, the videoconferencing unit 100 of FIG. 3 has an annotation function 133 that adds  
annotations to the displayed video.  
572 7, a portion of the videoconferencing system 10 operating in the annotation mode 400 is shown.  
573 In the annotation mode 400 , the user may make an annotation 410 on top of the video currently being  
displayed on the screen 202 .  
575 Annotations 410 can be made using the electronic pen 242, and can be made when an active video conference  
call is turned on or off.  
577 If the user wants to write on an object 402 displayed on the screen 202 (eg, a displayed document from a  
connected document camera or computer), as soon as the user picks up the electronic pen 242 from the tray  
420, the videoconferencing system 10 automatically to enter annotation mode 400.  
580 As previously discussed, a light sensor on the tray 240 of the display device 200 can be used to detect when the  
user picks up the pen 242 from the tray 240 .  
582 This data is sent from the display device 200 via the data interface with the videoconferencing unit 100, where  
the controller (120; Figure 3) of the unit 100 accesses the annotation function (133; Figure 3).

[0060]

587 In the annotation mode, the user can make annotations 410 on various videos or images displayed on the screen 202 of the device 200 .

588 The video and images may include videoconferencing video from the videoconferencing unit 100, video from a document camera, video from a VCR or DVD player, or computer screen images from a connected computer.

589 Video from document cameras, VCRs and DVD players can conform to National Television Standards Committee (NTSC) or Phase Alternation Line (PAL) standards.

590 The computer screen image may be XGA with 1024x768 resolution.

[0061]

598 When the annotation 410 is made on the screen 202, the graphical elements of the annotation 410 are combined with the displayed video.

599 By combining the annotations 410 with the displayed video, the annotations 410 are easily sent to the remote endpoints of the videoconference as part of the compressed video bitstream sent from the unit 100 to the remote endpoints over the videoconferencing network.

[0062]

606 In one embodiment, the user may make annotations 410 to the computer-provided content.

607 Preferably, the content from the computer is annotated.

608 The content may be the content of a whiteboard, a computer screen, an image, or visual media from a computer.

610 For example, a computer ( 50 ; FIGS. 2A-2B ) may be designated as the source of content displayed on screen 202 of touch screen device 200 .

612 During a video conference, the user can pick up the user tool 242 from the tray 240 of the touch screen device 200, and the video conference system 10 automatically switches to annotation mode operation.

614 Once in annotation mode operation, the computer (50) receives touch data from the touch screen device 200 and assembles the received touch data as an annotation to the computer content.

616 The computer ( 50 ) sends the annotation content to the touch screen device 200 to display the annotation content, and sends the annotation content to the video conference unit 100 .

618 The videoconferencing unit 100 receives the annotation content from the computer (50) and sends the received annotation content to the videoconferencing endpoint (not shown) through the unit's network interface (140; Figure 3).

621 Thus, content can be annotated and automatically sent over the network to remote endpoints.

[0063]

625 Preferably, sending the annotation content includes combining the annotation data with the content data so



that the combination can be sent over the network in accordance with the H.239 standard.

627 In addition, by utilizing the computer (50) to process the annotations and content displayed on the touch screen device 200, the delay problem that conventionally occurs when users make annotations during a video conference can be avoided.

630 Specifically, utilizing the computer (50) to process the annotations and content no longer requires the videoconferencing unit to process the annotation content and send the annotation content to the touch screen device 200 for display.

633 Typically, this feedback setting creates a delay between what annotations the user is currently making on the screen 202 of the display device 200 and how many annotations 410 are displayed.

635 Generally, any significant delay is not expected.

#### [0064]

639 As discussed above, the videoconferencing unit 100 of FIG. 3 also has a whiteboard function 134 that allows the display device 200 to function as a whiteboard.

641 8, a portion of videoconferencing system 10 operating in whiteboard mode 450 is shown.

642 To access this mode 450, the user picks up the electronic pen 242 from the tray 240 of the display device 100, and if another video source (eg, document camera, computer, VCR, DVD player, etc.) has not been selected, the videoconferencing system 10 automatically whiteboard operation mode 450 is entered.

645 The user can then begin writing a note 460 on the whiteboard content 452 displayed on the screen 202 .

646 Preferably, the whiteboard content 452 is an XGA image with a resolution of 1024x768.

647 The user can make annotations 460 on the whiteboard content 452 regardless of whether the system 10 is in a video conference call.

649 However, whiteboard content 452 with annotations 460 may be sent through videoconferencing unit 100 to a remote endpoint when in a videoconferencing call.

#### [0065]

654 As previously discussed with reference to Figures 2A-2B, system 10 may not include a computer.

655 In the absence of a computer, the videoconferencing unit 100 can generate a whiteboard by itself.

656 When the system 10 is currently displaying the graphical user interface or video data of the camera on the display device 200 , the videoconferencing unit 100 automatically enters the annotation mode operation when the user picks up the pen 242 from the tray 420 .

659 In annotation mode, videoconferencing unit 100 generates whiteboard content 452 .

660 Videoconferencing unit 100 receives touch data from the display device and assembles the touch data as annotations 460 to whiteboard content 452 .

662 The video conferencing unit 100 then sends the annotated whiteboard to the display device 200 and sends the annotated whiteboard as H.239 content to one or more remote endpoints of the video conference.

664 However, in alternative embodiments, system 10 may use an optional computer (50; Figures 2A-2B) to process whiteboard content 452 and annotations 460 so that videoconferencing unit 100 may use the annotated whiteboard as H .239 content is sent to one or more remote endpoints of a video conference.

[0066]

670 As previously described, an optional computer ( 50 ; FIGS. 2A-2B ) may be connected to system 10 .

671 Picking the pen 242 from the tray 240 may cause the system 10 to automatically select a VGA or video source to display full screen on the display device 200 and send to the remote endpoint of the video conference.

673 For example, instead of showing the whiteboard 452 as a background to the display, a computer screen from an optionally connected computer (50) could be shown.

675 The selection of the VGA or video source is based on the source currently selected by the system 10 .

676 For example, behaviors related to video annotation may be controlled by A/V controller 150 integrated into system 10, and A/V controller 150 may be configured to provide the methods disclosed herein for annotating video and switching between sources. feature.

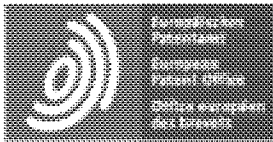
[0067]

682 The foregoing description of preferred and other embodiments is not intended to limit or limit the scope or applicability of the inventive concepts contemplated by the applicant.

684 By disclosing the inventive concepts contained herein, and in doing so, the applicant claims all patent rights afforded by the appended claims.

686 Accordingly, the appended claims are intended to cover all modifications and changes that come within the scope of the appended claims and their equivalents.





# Patent Translate

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## CLAIMS CN101009806A

1.

13 1. A video conference system, comprising:

14 at least one camera capable of at least one of pan, tilt or zoom;

15 a touch screen device configured to display video data and generate touch data; and

16 a videoconferencing unit operatively coupled to the touch screen device and the at least one camera, the videoconferencing unit configured to:

18 Establish a video conference with one or more endpoints over the network,

19 sending video data to the touch screen for display,

20 designating at least one area of the transmitted video data as at least one touch control for user selection, the at least one touch control for controlling pan, tilt or zoom of the at least one camera,

22 receiving touch data from the touch screen device,

23 associating the received touch data with the at least one touch control, and

24 Based on the associated touch controls, operation of the at least one camera is controlled.

2.

28 2. The system of claim 1, wherein the at least one camera includes a mechanical brake for panning, tilting or zooming the at least one camera; and for controlling the at least one camera based on the associated touch controls operation, the videoconferencing unit is configured to send a control signal to the mechanical brake.

3.

34 3. The system of claim 1, wherein the at least one camera includes electronic processing functionality to pan, tilt, or zoom video data captured by the at least one camera, and for controlling based on associated touch controls Operation of the at least one camera, the videoconferencing unit is configured to send control signals to the at least one camera causing it to perform the electronic processing function.

4.

41 4. The system of claim 1, wherein the at least one camera comprises a far end camera coupled to one of the endpoints, and wherein the video is used to control operation of the far end camera based on associated touch controls. The conference unit is configured to send control signals to the far-end cameras over the network.

5.

47 5. The system of claim 1, wherein the at least one camera includes a pan, tilt, or zoom function implemented mechanically or digitally.

6.

52 6. The system of claim 1, wherein the at least one camera comprises a pan-tilt-zoom camera, and to designate at least one area of the transmitted video data as at least one touch control for user selection, the The videoconferencing unit is configured to generate a grid for display in conjunction with video data sent to the touch screen device, the grid having at least one area corresponding to the at least one touch control for controlling the at least one camera pan, tilt or zoom.

7.

59 7. 6. The system of claim 6, wherein the grid includes a first pair of regions corresponding to a first touch control for panning the pan-tilt-zoom camera; a second pair of areas corresponding to a second touch control for tilting the pan-tilt-zoom camera; and a third pair of areas corresponding to a third touch control, the first Three touch controls are used to zoom the pan-tilt-zoom camera.

8.

67 8. The system of claim 1, wherein the at least one camera includes first and second cameras, and wherein the videoconferencing unit is configured to control operation of the first and second cameras based on associated touch controls is configured to:

70 determining which of the first and second cameras currently has video data being sent to the touch screen device, and

72 Based on the associated touch control, the operation of the determined one of the cameras is controlled.

9.

78 9. The system of claim 1, wherein the first camera includes a near-end camera associated with the videoconferencing unit, and the second camera includes a near-end camera associated with one of the endpoints of the videoconference remote camera.

10.

82 10. A video conference system, comprising:

83 Multiple video data sources;

84 a touch screen device configured to display video data and generate touch data; and

85 a videoconferencing unit operatively coupled to the touch screen device and the video data source, the  
videoconferencing unit configured to:

87 Establish a video conference with one or more endpoints over the network,

88 receiving video data from one or more of the video data sources,

89 sending the received video data to the touch screen for display,

90 receiving control data from the touch screen device,

91 In response to the control data, switching from one source of video data to another source of video data is  
performed automatically.

11.

96 11. The system of claim 10, wherein the video data source is from a network interface, a video camera, a  
video cassette recorder, a digital versatile disc player, a laptop computer coupled to the one or more endpoints  
via a network Selected from the group of Computers, Personal Computers, Visual Source Programmable  
Controllers, and Extended Graphics Array Splitters.

12.

103 12. 11. The system of claim 10, wherein the touch screen device includes a user tool having a sensor that  
generates control data when the user tool is moved, and in response to the control data, to automatically from  
the One video data source is switched to another video data source, the video conferencing unit is configured  
to:

107 determining whether the user tool has been moved based on the control data;

108 In response to the user tool being moved, one of the video data sources is selected.

13.

112 13. 13. The system of claim 12, wherein, in order to automatically switch from one source of video data to  
another source of video data, the videoconferencing unit is configured to:

114 generating a whiteboard in response to the moved user tool,

115 receiving touch data from the touch screen device, and

116 combining the received touch data as a note to the whiteboard, and

117 The annotated whiteboard is sent to the touch screen device for display and sent over the network to the one  
or more endpoints of the video conference.

14.

122 14. The system of claim 10, wherein,  
123 The touch screen device includes a first data interface,  
124 the videoconferencing unit includes a second data interface coupled to the first data interface, and  
125 The second data interface receives touch data from the first data interface of the touch screen device.

15.

129 15. The system of claim 14, further comprising:  
130 a computer having a video output and having a data interface coupled to another data interface of the touch  
screen device; and  
132 an extended graphics array splitter having a video input coupled to the video output of the computer, the  
splitter having a video output coupled to a video input of the videoconferencing unit, and having a video  
output coupled to the touch screen device Another video output is coupled to another video input.

16.

138 16. 15. The system of claim 14, further comprising a visual controller having data coupled between the  
videoconferencing unit and the first and second data interfaces of the touch screen device interface.

17.

143 17. 17. The system of claim 16, wherein one or more of the video data sources are coupled to one or more  
video inputs of the visual controller, and wherein the visual controller includes a link to the video One or  
more video outputs to which one or more video inputs of the conference unit are coupled.

18.

149 18. A video conference system, comprising:  
150 a touch screen device configured to display video data and generate touch data, the touch screen device  
including first and second video inputs and first and second data interfaces;  
152 a computer coupled to the first video input and the first data interface of the touch screen device, the  
computer having a video output for content; and  
154 A video conferencing unit, coupled to the video output of the computer, and to the second video input and  
the second data interface of the touch screen device, the video conferencing unit having the ability to  
communicate with one or more The endpoint establishes a network interface for the video conference;  
157 wherein, in the annotation mode of operation, the computer is configured to:  
158 receive touch data from touch screen devices,  
159 combine the received touch data as an annotation to the content, and  
160 sending the annotated content to the touch screen device for display and to the video conferencing unit,  
161 wherein, in the annotation mode of operation, the videoconferencing unit is configured to:  
162 receive the annotated content from the computer, and  
163 The received annotated content is sent to the endpoint over the network.

19.

167 19. 19. The system of claim 18, wherein, in the annotation mode of operation, the content sent from the computer includes a whiteboard, a computer screen, images, and visual media.

20.

172 20. 19. The system of claim 18, wherein the touch screen device includes a user tool having a sensor that generates control data when the user tool is moved, and the videoconferencing system is configured to respond to the generated control data, automatically switch to the annotation operation mode.

21.

178 21. The system of claim 18, further comprising:

179 an extended graphics array splitter having a video input coupled to the video output of the computer; the splitter having a video output coupled to a video input of the videoconferencing unit and having a video input coupled to the touch screen device The first video input is coupled to another video output.

22.

185 22. 21. The system of claim 21, further comprising a visual controller having data coupled between a data interface of the videoconferencing unit and the second data interface of the touch screen device interface.

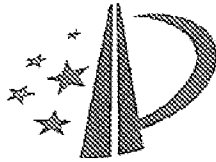
23.

190 23. 23. The system of claim 22, wherein at least one source of video data is coupled to a video input of the visual controller, and wherein the visual controller includes a video output coupled to the video input of the videoconferencing unit.

24.

196 24. 24. The system of claim 23, wherein the at least one video data source is selected from the group consisting of a video camera, a video cassette recorder, and a digital versatile disc player.

[19] 中华人民共和国国家知识产权局



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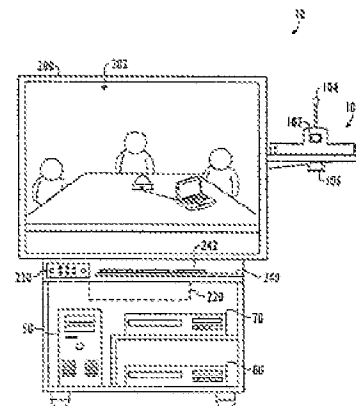
权利要求书 5 页 说明书 15 页 附图 5 页

## [54] 发明名称

使用触摸屏界面控制视频会议的系统和方法

## [57] 摘要

视频会议系统包括触摸屏设备和视频会议单元。显示设备显示用于视频会议的视频数据，并基于相对所述触摸屏的用户选择来生成触摸数据。例如，视频会议单元通过视频连接和数据接口连接，与触摸屏设备可操作地耦合。所述单元通过网络，建立并进行与一个或多个端点的视频会议。所述单元将视频数据发送至显示设备，并接收来自所述设备的触摸数据。所接收的触摸数据用于控制视频会议系统的操作。所接收的触摸数据可以用于发起视频会议呼叫、改变操作参数、改变摄像机的定向、发起画中画显示、访问菜单、访问存储器、改变视频数据源、发起白色书写板显示、以及访问所连接设备的屏幕。



200710007301.4

## 权 利 要 求 书

第1/5页



- 1、一种视频会议系统，包括：  
至少一个摄像机，能够进行摇镜头、倾斜或变焦中的至少一种；  
触摸屏设备，被配置来显示视频数据和生成触摸数据；以及  
视频会议单元，与所述触摸屏设备和所述至少一个摄像机操作性地耦合，所述视频会议单元被配置来：  
    通过网络与一个或多个端点建立视频会议，  
    将视频数据发送至所述触摸屏以用于显示，  
    将所发送视频数据的至少一个区域指定作为针对用户选择的至少一个触摸控制，所述至少一个触摸控制用于控制所述至少一个摄像机的摇镜头、倾斜或变焦，  
    接收来自所述触摸屏设备的触摸数据，  
    将所接收的触摸数据于所述至少一个触摸控制相关联，以及  
    基于所关联的触摸控制，控制所述至少一个摄像机的操作。
- 2、如权利要求1所述的系统，其中，所述至少一个摄像机包括机械制动器，用于使所述至少一个摄像机摇镜头、倾斜或变焦；以及为了基于所关联的触摸控制来控制所述至少一个摄像机的操作，所述视频会议单元被配置来将控制信号发送至所述机械制动器。
- 3、如权利要求1所述的系统，其中，所述至少一个摄像机包括对由所述至少一个摄像机捕获的视频数据进行摇镜头、倾斜或变焦的电子处理功能，以及为了基于所关联的触摸控制来控制所述至少一个摄像机的操作，所述视频会议单元被配置来将控制信号发送至所述至少一个摄像机，使其执行所述电子处理功能。
- 4、如权利要求1所述的系统，其中，所述至少一个摄像机包括与所述端点之一耦合的远端摄像机，以及为了基于所关联的触摸控制来控制所述远端摄像机的操作，所述视频会议单元被配置来将控制信号通过所述网络发送至所述远端摄像机。
- 5、如权利要求1所述的系统，其中，所述至少一个摄像机包括



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由机械制动或者数字实现的摇镜头、倾斜或变焦功能。

6、如权利要求1所述的系统，其中，所述至少一个摄像机包括摇镜头-倾斜-变焦摄像机，以及为了将所发送的视频数据的至少一个区域指定作为针对用户选择的至少一个触摸控制，所述视频会议单元被配置来生成与发送至所述触摸屏设备的视频数据结合显示的网格，所述网格具有与相对应的至少一个区域，所述至少一个触摸控制用于控制所述至少一个摄像机的摇镜头、倾斜或变焦。

7、如权利要求6所述的系统，其中，所述网格包括与第一触摸控制相对应的第一区域对，所述第一触摸控制用于使所述摇镜头-倾斜-变焦摄像机摇镜头；与第二触摸控制相对应的第二区域对，所述第二触摸控制用于使所述摇镜头-倾斜-变焦摄像机倾斜；以及与第三触摸控制相对应的第三区域对，所述第三触摸控制用于使所述摇镜头-倾斜-变焦摄像机变焦。

8、如权利要求1所述的系统，其中，所述至少一个摄像机包括第一和第二摄像机，以及为了基于所关联的触摸控制来控制所述第一和第二摄像机的操作，所述视频会议单元被配置来：

确定所述第一和第二摄像机中的哪个当前具有正发送至所述触摸屏设备的视频数据，以及

基于所关联的触摸控制，控制所确定的一个摄像机的操作。

9、如权利要求1所述的系统，其中，所述第一摄像机包括与所述视频会议单元相关联的近端摄像机，以及所述第二摄像机包括与所述视频会议的所述端点之一相关联的远端摄像机。

10、一种视频会议系统，包括：

多个视频数据源；

触摸屏设备，被配置来显示视频数据并生成触摸数据；以及

视频会议单元，与所述触摸屏设备和所述视频数据源操作性地耦合，所述视频会议单元被配置来：

通过网络与一个或多个端点建立视频会议，

接收来自所述视频数据源中的一个或多个的视频数据，

将所接收的视频数据发送至所述触摸屏以用于显示，

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接收来自所述触摸屏设备的控制数据，

响应于所述控制数据，自动地从一个视频数据源切换至另一视频数据源。

11、如权利要求 10 所述的系统，其中，所述视频数据源是从包括通过网络与所述一个或多个端点耦合的网络接口、摄像机、视频盒式磁带录像机、数字通用盘播放器、膝上计算机、个人计算机、可视源的可编程控制器、以及扩展图形阵列分路器的组中选择的。

12、如权利要求 10 所述的系统，其中，所述触摸屏设备包括具有传感器的用户工具，当移动所述用户工具时，所述传感器生成控制数据，以及为了响应于所述控制数据，以自动地从一个视频数据源切换至另一视频数据源，所述视频会议单元被配置来：

根据所述控制数据，确定是否移动了所述用户工具；

响应于所移动的用户工具，选择所述视频数据源之一。

13、如权利要求 12 所述的系统，其中，为了自动地从一个视频数据源切换至另一视频数据源，所述视频会议单元被配置来：

响应于所移动的用户工具，生成白色书写板，

接收来自所述触摸屏设备的触摸数据，以及

将所接收的触摸数据作为注释组合到所述白色书写板，以及

将注释后的白色书写板发送至所述触摸屏设备以用于显示，并通过所述网络发送至所述视频会议的所述一个或多个端点。

14、如权利要求 10 所述的系统，其中，

所述触摸屏设备包括第一数据接口，

所述视频会议单元包括与所述第一数据接口耦合的第二数据接口，以及

所述第二数据接口接收来自所述触摸屏设备的所述第一数据接口的触摸数据。

15、如权利要求 14 所述的系统，还包括：

计算机，具有视频输出、并具有与所述触摸屏设备的另一数据接口耦合的数据接口；以及

扩展图形阵列分路器，具有与所述计算机的所述视频输出耦合的



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视频输入，所述分路器具有与所述视频会议单元的视频输入耦合的视频输出、并具有与所述触摸屏设备的另一视频输入耦合的另一视频输出。

16、如权利要求 14 所述的系统，还包括可视控制器，所述可视控制器具有在所述视频会议单元和所述触摸屏设备的所述第一和第二数据接口之间耦合的数据接口。

17、如权利要求 16 所述的系统，其中，所述视频数据源中的一个或多个与所述可视控制器的一个或多个视频输入耦合，以及所述可视控制器包括与所述视频会议单元的一个或多个视频输入耦合的一个或多个视频输出。

18、一种视频会议系统，包括：

触摸屏设备，被配置来显示视频数据并生成触摸数据，所述触摸屏设备包括第一和第二视频输入、以及第一和第二数据接口；

计算机，与所述触摸屏设备的所述第一视频输入和所述第一数据接口耦合，所述计算机具有针对内容的视频输出；以及

视频会议单元，与所述计算机的所述视频输出耦合、并与所述触摸屏设备的所述第二视频输入和所述第二数据接口耦合，所述视频会议单元具有通过网络与一个或多个端点建立视频会议的网络接口；

其中，在注释操作模式中，所述计算机被配置来：

接收来自触摸屏设备的触摸数据，

将所接收的触摸数据作为注释组合到内容，以及

将注释后的内容发送至所述触摸屏设备以用于显示、并发送至所述视频会议单元，

其中，在所述注释操作模式中，所述视频会议单元被配置来：

接收来自所述计算机的注释后的内容，以及

通过网络，将所接收的注释后的内容发送至所述端点。

19、如权利要求 18 所述的系统，其中，在所述注释操作模式中，从所述计算机中发送的所述内容包括白色书写板、计算机屏幕、图像和可视媒体。

20、如权利要求 18 所述的系统，其中，所述触摸屏设备包括具



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有传感器的用户工具，当移动所述用户工具时，所述传感器生成控制数据，以及所述视频会议系统被配置来响应于所生成的控制数据，自动地切换至所述注释操作模式。

21、如权利要求 18 所述的系统，还包括：

扩展图形阵列分路器，具有与所述计算机的所述视频输出耦合的视频输入；所述分路器具有与所述视频会议单元的视频输入耦合的视频输出，并具有与所述触摸屏设备的所述第一视频输入耦合的另一视频输出。

22、如权利要求 21 所述的系统，还包括可视控制器，所述可视控制器具有在所述视频会议单元的数据接口与所述触摸屏设备的所述第二数据接口之间耦合的数据接口。

23、如权利要求 22 所述的系统，其中，至少一个视频数据源与所述可视控制器的视频输入耦合，以及所述可视控制器包括与所述视频会议单元的视频输入耦合的视频输出。

24、如权利要求 23 所述的系统，其中，所述至少一个视频数据源是从包括摄像机、视频盒式磁带录像机和数字通用盘播放器的组中选择的。



## 使用触摸屏界面控制视频会议的系统和方法

### 技术领域

本公开的主题涉及一种使用触摸屏界面控制视频会议的系统和方法。

### 背景技术

典型地，视频会议系统的用户使用遥控器来操作和控制系统。此外，控制面板、写字板输入设备、小键盘、或者网络接口可以用于操作和控制系统。当使用手持遥控器时，用户将遥控器瞄准视频会议系统，并通过用户界面的许多选择和菜单来导航以操作和控制系统。典型地，写字板输入设备和键盘必须适当地与视频会议系统连接，而适当连接对用户来说可能比较难。对于视频会议，用户还希望设置具有注释工具的文档摄像机（document camera）或计算机，以使用户能够将记录和注释添加至视频会议。不幸地，可能难以设置并与视频会议系统一起使用具有注释工具的文档摄像机和计算机。

本领域公知的一种现有技术的视频会议系统是可从 Polycom, Inc 公司获得的 3000iPower。3000iPower 包括 Polycom iPower 9800 和 SMART 技术公司的后投影（Rear Projection）SMART Board™ 3000i 交互式白色书写板（whiteboard）。iPower 9800 具有基于 PC 的设计，从而实质上作为计算机来操作。3000iPower 允许在视频会议电话中对计算机图像进行投影和观看，以及 3000iPower 提供用于访问会议应用的触摸屏控制。用户可以使用 3000iPower 的笔托盘（tray）上的笔，在白色书写板上做笔记高亮突出重要信息。

本公开的主题意在克服、或者至少减小以上提出的一个或多个问题的影响。



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## 发明内容

视频会议系统包括触摸屏显示设备和视频会议单元。显示设备显示了用于视频会议的视频数据，并基于相对触摸屏的用户选择来生成触摸数据。视频会议单元通过例如视频连接和数据接口连接，来与触摸屏设备操作性地耦合。该单元通过网络与一个或多个端点建立和进行视频会议。该单元将视频数据发送至显示设备，并接收来自该设备的触摸数据。所接收的触摸数据用于控制视频会议系统的操作。所接收的触摸数据可以用于发起视频会议呼叫、改变操作参数、改变摄像机定向、发起画中画显示、访问菜单、访问存储器、改变视频数据源、发起白色书写板显示、以及访问所连接设备的屏幕。

前述概要并不意在总结每个可能实施例、或者本公开的每个方面。

## 附图说明

结合附图，参照特定实施例的详细描述，将最佳地理解本公开主题的上述概要、优选实施例、以及其它方面，其中：

图 1 示出了根据本公开特定说明的视频会议系统的实施例。

图 2A 示出了视频会议系统实施例的示意图。

图 2B 示出了视频会议系统另一实施例的示意图。

图 3 示意性地示出了视频会议单元的组件。

图 4 示出了触摸屏显示设备的控制面板的实施例。

图 5 示出了视频会议系统菜单功能的实施例。

图 6 示出了视频会议系统摄像机功能的实施例。

图 7 示出了视频会议系统注释功能的实施例。

图 8 示出了视频会议系统白色书写板功能的实施例。

尽管本公开的主题可以有不同的修改和可选形式，但是在附图中，作为示例示出了本公开主题的特定实施例，并进行了详细地描述。附图和文字描述并不意在以任何方式限制本发明构思的范围。而是，如 35 U.S.C. § 112 所要求的，提供附图和文字描述，以通过参考特定示例来向本领域技术人员示出本发明构思。



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## 具体实施方式

参照图 1，示出了根据本公开特定说明的视频会议系统 10 的实施例。视频系统 10 包括视频会议单元 100 和触摸屏显示设备 200。视频会议系统 10 还可以包括一个或多个外围设备，如，计算机（膝上或台式）50、视频盒式磁带录像机（VCR）70、和数字通用盘（DVD）播放器 80。在一个实施例中，视频会议单元 100 是可从 Polycom, Inc（本公开的受让人）获得的 VSX 8000，以及触摸屏显示设备 200 是可从加拿大的 SMARTTechnologies 获得的 3000i model SMARTBoard。在可选实施例中，视频会议单元 100 和触摸屏显示设备 200 可以集成在一起用于视频会议系统 10。

视频会议单元 100 用于通过网络与远程端点（未示出）建立和进行视频会议。视频会议单元 100 具有摄像机 102 和麦克风 104。依据实施方式，单元 100 可以具有其它共有组件，如，红外（IR）检测器 106。触摸屏显示设备 200 能够既向用户显示视频、又接收来自用户的触摸和注释。在一个实施例中，触摸屏显示设备 200 是具有环绕屏幕 202 的光传感器的视频监视器等，用于检测何时用户触摸屏幕 202 的区域、或在屏幕 202 的区域上书写。例如，视频监视器可以是传统电视显示器、平板显示器、或本领域公知的其它显示器的一部分。触摸屏显示设备 200 还可以使用本领域公知的其它触摸屏技术。

作为 3000i model SMARTBoard，设备 200 包括投影屏幕 202、集成扩展图形阵列（XGA）投影仪 220、控制面板 230 和托盘 240。设备 200 还包括音频系统（未示出）。为了检测何时用户触摸屏幕，设备 200 使用数字摄像机（未示出）来检测目标和相对显示屏幕 202 的运动。如以下所讨论的，显示设备 200 的控制面板 230 包括配置以结合视频会议单元 100 操作的按钮。托盘 240 具有多种工具 242，如笔和擦除器。托盘 140 上的光传感器（未示出）用于检测用户何时从托盘 140 中拾取特定的笔或擦除器工具 242。

参照图 2A 和 2B，示出了图 1 视频会议系统 10 实施例的示意图。在图 2A 的实施例中，系统 10 的视频会议单元 100 直接与触摸屏显示设备 200 耦合。随后的讨论集中于视频会议系统 10 的视频连接。然而，





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将会理解，视频会议系统 10 可以具有音频连接。例如，视频会议单元 100 可以具有与显示设备 200 的音频连接，并可以将音频数据发送至显示设备 200 的扬声器。

对于系统 10 的视频连接，摄像机 102 与单元 100 的输入 114 耦合，如，S-视频连接。视频会议单元 100 具有与显示设备 200 的视频输入 212 耦合的视频输出 112。例如，XGA 电缆可以用于将单元 100 的 XGA 输出 112 与显示设备 200 的 RGB 输入 212 连接。视频会议单元 100 还具有与显示设备 200 的串口 (COM1) 213 耦合的串口 113。单元 100 和显示设备 200 使用串口 113 和 213，在彼此之间传输数据。该数据包括通过显示设备 200 获得、并传输至单元 100 的触摸数据，单元 100 使用用于以下所讨论的操作的触摸数据。所传输的数据还包括通过用户选择显示设备 200 控制面板（未示出）上配置的按钮而生成的数据。

视频会议系统 10 还可以包括多个可选组件，这些可选组件可用于系统 10 的一些实施方式或功能。例如，一个或多个可选 VCR 或 DVD 播放器 70 或 80 可以与单元 100 的一个或多个输入 118 耦合。此外，可选的膝上或其它计算机 50 可以通过串口 (COM2) 215，与触摸屏设备 200 耦合。如果计算机 50 具有适当软件，则计算机 50 与设备 200 的串口 (COM2) 215 的耦合可以允许显示设备 200 作为独立组件，与视频会议单元 100 相分离地操作。

计算机 50 还可以与扩展图形阵列 (XGA) 分路器 60 耦合，该 XGA 分路器 60 与视频会议单元 100 的输入 116 耦合，并与显示设备 200 的 RGB 输入 216 耦合。计算机 50 和分路器 60 与单元 100 和设备 200 的耦合允许计算机 50 提供要由设备 200 显示、以及要由视频会议单元 100 处理和转发至远程端点（未示出）的计算机上的内容、图像等。在一个实施例中，如果计算机 50 具有将计算机 50 与单元 100 集成的适当软件，则计算机 50 可以具有用于控制视频会议单元 100 的操作的图形用户界面。当在以下讨论的“PC 指示”操作模式中进行操作时，可以在显示设备 200 上显示使用计算机 50 来控制单元 100 的 GUI。

在图 2B 中的视频会议系统 10 的实施例中，视频会议单元 100 再

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次具有直接与显示设备 200 的 RGB 输入 212 耦合的视频输出 112。然而，单元 100 的串口 113 与 A/V 控制器 150 耦合，A/V 控制器 150 与显示设备 200 的串口 (COM1) 213 耦合。使用 A/V 控制器 150，单元 100 和设备 200 可以使用串口 113 与 213，在彼此之间传输数据。

在一个实施例中，A/V 控制器 150 是 POINTMAKER®PVI 视频标记器，这是用于控制音频和视频设备的可编程设备，并且可从 Arizona, Tucson 的 Boeckeler Instruments, Inc 获得。视频会议单元 100 通过串口 113 与 A/V 控制器 150 的串行连接允许单元 100 控制 A/V 控制器 150 的操作。

如先前的实施例中所述，摄像机 102 直接与单元 100 的摄像机输入 114 耦合。然而，例如 VCR/DVD 70/80、文档摄像机 90、计算机 50、以及 XGA 分路器 60 等可选组件与 A/V 控制器 150 耦合。A/V 控制器 150 向视频会议单元 100 的一个或多个输入 115 提供来自个人计算机 50 的第一视频数据 152、来自 VCR/DVD 70/80 的第二视频数据 154、以及来自文档摄像机 90 的第三视频数据 156。

在本实施例中，文档摄像机 90 可以通过 S-视频电缆与 A/V 控制器 150 的 S-视频输入连接。来自 A/V 控制器 150 的 S-视频输入的 S-视频电缆可以与单元 100 的第二摄像机输入连接。可以通过来自 VCR/DVD 70/80 的复合视频输出的 RCA 或 BNC 电缆，将 VCR/DVD 70/80 连接至 A/V 控制器 150 的复合视频输入。来自 A/V 控制器 150 的复合视频输出的 BNC 或 S-视频电缆可以与视频会议单元 100 的 VCR/DVD 视频输入连接。可以通过来自 A/V 控制器 150 的 VGA 输出的 XGA/VGA 电缆，将来自 A/V 控制器 150 的视频与视频会议单元 100 的 VGA 输入连接。

参照图 3，更加详细地示意性示出了视频会议系统 10 的附加组件。视频会议单元 100 具有控制器 120，该控制器 120 可以包括任何常规的编码器、处理器和本领域公知、并用于视频会议单元的其它电子组件。控制器 120 与视频的输入 112、数据接口的串口 113、以及存储功能 131-135 的存储器 130 耦合。控制器 120 还与来自近端 (near) 摄像机 102 的视频的输入 114 耦合，并且可以与接口 115 耦合，以控制





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近端摄像机 102。视频输出 112 与显示设备 200 的视频输入 212 耦合，以及串口 113 与显示设备 200 的串口 213 交换数据。例如，串口 113 接收来自显示设备 200 的触摸数据，串口 113 可以与显示设备 200 交换控制数据。

控制器 120 包括视频编解码器 122 和数据处理器 124。视频编解码器 112 负责处理要由显示设备 200 显示、并要发送至视频会议端点的视频数据。通常，视频数据可以包括由单元 100 的摄像机（未示出）所捕获的图像、来自视频会议远程端点的视频、来自外围设备（例如，VCR、DVD 播放器、计算机、文档摄像机等）的内容、来自显示设备 200 的注释、以及其它可视数据。在视频会议环境中的这种视频编解码器 122 的操作是本领域公知的，不在这里进行描述。

数据处理器 124 负责处理视频会议单元 100 的数据。该数据包括来自显示设备 200 的触摸数据、通信数据、命令、视频会议信息等。控制器 120 还与网络接口 140（如，普遍用于视频会议单元的）耦合，以及网络接口 150 与本领域公知的视频会议网络 142 耦合。

控制器 120 使用存储于存储器 130 中的操作功能 131-135，来控制视频会议系统 10 的至少一些特征的操作。这些操作功能包括在屏图形用户界面（GUI）功能 131、摄像机功能 132、注释功能 133、白色书写板功能 134、以及辅助设备功能 135。之后更加详细地讨论这些操作功能 131-135 中的每个，但是在这里提供这些功能 131-135 的一般性概述。

在屏 GUI 功能 131 允许视频会议单元 100 在显示设备 200 上显示图形用户界面，该图形用户界面用于控制系统 10 的操作。视频会议单元 100 的图形用户界面可以包括可以在显示设备 200 上显示的多个触摸控制、菜单、以及对话，以便用户操作和控制系统 10。例如，单元 100 的图形用户界面可以允许用户通过目录、速度拨号（speed dial）、或者手动拨号菜单来进行视频会议呼叫；应答呼入的视频会议呼叫；挂断视频会议呼叫；静音或改变音频的音量；选择摄像机和内容源，交换画中画（PIP）中的远近视频，以及这里公开的其它操作。

摄像机功能 132 允许视频会议单元 100 在显示设备 200 上显示可



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视触摸控制，以控制一个或多个摄像机（如，近端摄像机 102）的操作。在一个实施例中，近端摄像机 102 是摇镜头-倾斜-变焦（pan-tilt-zoom）摄像机，能够摇镜头、倾斜和变焦。近端摄像机 102 的摇镜头、倾斜和变焦能力中的一个或多个可以通过如用于本领域中的操作视频会议单元的摇镜头-倾斜-变焦摄像机的一个或多个机械制动器 103 来实现。接口 115 与制动器 103 耦合，以及控制器 120 通过接口 115，使用控制信号来控制近端摄像机 102 的摇镜头、倾斜和变焦能力的操作。利用显示设备 200 上的可视触摸控制的用户可以生成控制信号来控制近端摄像机 102 的摇镜头、倾斜和变焦。

可选地，可以电子地获得近端摄像机 102 的摇镜头、倾斜和变焦能力。例如，近端摄像机 102 可以具有摇镜头、倾斜和变焦的处理能力，以及控制器 120 可以通过接口 115，使用控制信号来控制该处理。在另一示例中，作为替代，控制器 120 可以具有摇镜头、倾斜和变焦的处理能力，以及控制器 120 可以基于通过视频输入 114 从近端摄像机 102 中接收的视频，来执行那些操作。

除了控制近端摄像机 102 之外，摄像机功能 132 允许视频会议单元 100 在显示设备 200 上显示可视触摸控制，用于控制网络 142 上的远端摄像机 114 的操作。例如，远端摄像机 144 可以与参与视频会议的远程端点相关联。使用网络接口 140，控制器可以使用控制信号来控制远端摄像机 144 的摇镜头、倾斜和变焦能力。例如，远端摄像机 144 可以是具有一个或多个机械制动器、或者具有电子处理能力的摇镜头-倾斜-变焦摄像机。控制器 120 可以使用远端摄像机控制协议（如，在 H.323 的附录 Q 中描述的 H.224），通过网络接口 140 来控制远端摄像机 144。

注释功能 133 允许用户对在显示设备 200 上显示的视频进行注释，以及白色书写板功能 134 允许用户在显示设备 200 上显示的白色书写板上进行注释。最后，辅助设备功能 135 允许视频会议单元 100 显示来自如计算机、膝上计算机、VCR、DVD 播放器等的其它辅助设备的视频。

如将从以上的大体描述中显而易见的，操作功能 131-135 允许视



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视频会议单元 100 在注释模式和在触摸控制模式中操作触摸屏显示设备 200。模式的确定可以依据是否从显示设备 200 的托盘 240 中拾取了笔或擦除器工具 242。例如，如果从托盘拾起笔或擦除器工具 242，则视频会议单元 100 可以在注释模式中操作显示设备 200，从而用户可以在设备 200 上显示的视频上作出注释。视频可以是视频会议或其它内容，以及可以来自视频会议单元 100、计算机、膝上计算机、VCR、DVD 播放器、文档摄像机等。当将工具 242 中的所有工具放置在托盘 240 内时，视频会议单元 100 可以在触摸控制模式中操作显示设备 200，从而用户可以通过触摸与单元 100 的图形用户界面、触摸控制、菜单、对话等相对应的显示器 200 区域，来控制视频系统 10 的操作。

提供了视频会议单元 100 怎样控制视频会议系统 10 的操作的大体概述，现在参考图 4 至 8，以更加详细地讨论视频会议单元 100 的操作功能。

如上所述，视频会议单元 100 使用辅助设备功能 135 来控制触摸屏显示设备 200 的操作。通过集成显示设备 200 的控制面板（230；图 1）上的控制与视频会议单元 100，来实现所述控制的一种方式。参照图 4，示出了触摸屏显示设备（未示出）的控制面板 230 的实施例。如先前所讨论的，优选地，触摸屏显示设备是 3000i model SMART Board。同样，3000i model SMART Board 的控制面板 230 具有多个按钮，配置用于控制显示设备的音量等级、亮度等级和对比度等级。然而，作为视频会议单元与所公开的视频会议系统的显示设备之间集成的一部分，如图 4 的实施例所示，重新配置显示设备的控制面板 230 上的按钮（为了方便，在图 4 中，同时参考本公开图 1 中组件的参考数字）。

控制面板 230 包括第一按钮 231，配置来发起视频会议操作模式。在该模式中，视频会议单元（100）通过经由网络来建立与远程端点的视频会议连接、将视频会议的视频发送至显示设备（200）的 RGB 输入、以及在显示设备（200）与单元（100）之间传输图形用户界面和触摸数据，建立和进行视频会议。

面板 230 的第二按钮 232 配置用于：如果个人计算机（50）与所



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公开的视频会议系统耦合，则发起个人计算机（50）的控制。在该模式中，可以在视频会议期间示出来自计算机（50）的内容。该内容可以包括计算机的屏幕、存储于计算机上的视频或其它图像、PowerPoint 展示、文件等。在视频会议期间，由视频会议单元（10）处理来自计算机（50）的内容，并将其发送至显示设备（200）。还可以将该内容发送至视频会议的远程端点。

面板 230 的第三按钮 233 配置来发起 PC 指示操作模式。在该模式中，将来自计算机（50）的视频数据直接从分路器（60）的 XGA 输出发送至显示设备（200）的 RGB 输入，而不是从视频会议单元（100）的视频编解码器发送。无论是否在视频会议呼叫中、或者无论是否在将计算机内容发送至其它端点，都可以进行以上操作。面板 230 的第四按钮 234 配置来发起视频操作模式，其中，显示设备（200）操作来通过 S-视频连接来接收来自连接源的视频。

除了控制面板 230 上的按钮之外，显示设备（200）还包括设备托盘（240）上的其它按钮 235 和 236。为了方便，在图 4 中与托盘（240）相分离地示出了这些按钮 235 和 236。第一托盘按钮 235 最初配置用于：当利用所耦合的计算机或膝上计算机的软件操作显示设备（200）时，访问显示设备（200）屏幕上的在屏键盘。然而，对于本公开的视频会议系统（10），将按下该键盘按钮 235 重新配置用于：如果放下显示设备（200）的托盘（240）上所有的笔（242）、以及如果单元（100）生成键盘的显示适当的屏幕，则访问视频会议单元（100）的在屏键盘。然而，如果从托盘（240）中拾起笔（242），则该按钮 235 配置用于：如果 A/V 控制器（150；图 2A）是视频会议系统（10）的实施方式的组件，则访问该 A/V 控制器（150；图 2A）的校准屏幕。利用所访问的菜单屏幕，用户可以使用触摸屏显示设备（200）来对 A/V 控制器（150；图 2A）进行校准。

第二托盘按钮 236 最初配置来在利用所耦合的计算机或膝上型计算机（50）的软件操作显示设备（200）时，作为鼠标右键点击而操作。然而，对于本公开的视频会议系统（10），将按下该按钮 236 重新配置用于：如果放下显示设备（200）的托盘（240）上的笔（242），则开



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始和停止视频会议单元(100)的VGA图形。如果从托盘(240)中拾起笔(242),则该按钮236配置用于:如果A/V控制器(150;图2B)是实施方式的一部分,则访问该A/V控制器(150;图2B)的菜单。利用所访问的菜单屏幕,用户可以使用触摸屏显示设备(200)来控制A/V控制器(150;图2B)的操作。

暂时返回图3,如先前所讨论的,视频会议单元100具有在屏GUI功能131,以在用于控制系统10操作的显示设备200上显示用户界面、菜单、触摸控制、对话等。在屏GUI功能131的一部分包括在显示设备200上显示触摸控制,以及针对那些触摸控制,在视频会议单元100处从显示设备200中接收触摸数据,以控制系统10的操作。换言之,显示设备200用于检测来自触摸屏显示设备200上的用户触摸、电子笔等的信息、选择、注释。将检测到的触摸数据发送至视频会议单元100。触摸数据用于操作视频会议系统10。

例如,显示设备200的触摸屏区域中的触摸或释放引起了与配置用于视频会议单元100的用户界面特征的触摸和/或释放相对应的事件。如果用户的触摸是在未指定为单元100的用户界面的触摸控制的屏幕区域上,则可以通过可访问摄像机控制或引出主菜单等的监督算法来处理触摸数据。因此,单元100确定图形用户界面(GUI)和/或视频当前是否在显示设备200上显示。例如,如果单元100正在显示GUI,则用户将能够使用手指或电子笔242来触摸显示设备200的屏幕,并产生视频会议单元100的输入。

参照图5,在显示设备(200)的触摸屏202上示出了由视频会议单元(100)生成的菜单310的实施例。当正在显示视频时,用户选择显示在屏幕202左上角上的按钮302时,可以调用菜单310。优选地,按钮302是透明的或隐藏的,并可从包括参与者和内容的视频的那些视频的所有屏幕中得到。一旦调用了菜单310,则菜单310允许用户通过直接在屏幕202上使用交互触摸,来控制视频会议系统。优选地,菜单310是透明的,并显示在屏幕202上当前显示的视频之上。

菜单310包括与遥控器上可用的按钮类似的多个触摸控制312。这些触摸控制312包括返回(Home)按钮、呼叫(Call)按钮、挂断





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按钮、音量按钮、静音按钮、摄像机按钮、画中画（PIP）按钮、近端按钮、远端按钮、预先设置按钮、以及关闭按钮。可以依据实施方式，在菜单 310 中设置这些和其它按钮。例如，一些其它可能按钮包括用于引出帮助的按钮和用于在屏键盘的按钮。

触摸控制 312 可以类似于在实际遥控器上找到的相应控制来进行操作。这里，差别在于，在屏幕 202 上显示的视频数据的指定区域与用于控制和操作视频系统的触摸控制相关联。例如，选择菜单 310 上的呼叫按钮可以发起视频会议呼叫。为了发起呼叫，可以在屏幕 202 上访问速度拨号对话或地址簿对话，以选择与哪个远程端点建立视频会议。选择菜单 310 上的挂断按钮可以结束视频会议呼叫，或者，如果存在多于一个的当前有效的呼叫，则可以在屏幕 202 上引出挂断对话。选择菜单 310 上的音量按钮可以在屏幕 202 上引出音量条，然后用户可以触摸显示在屏幕 202 上的音量条来控制音量。菜单 310 上的静音和 PIP 可以是拨动（toggle）按钮，用于对音频消音和在屏幕 202 上产生画中画。

选择菜单 310 上的预先设置按钮可以引出屏幕 202 上的预先设置对话，以及用户可以从多个所存储的预先设置中进行选择、或者触摸和保持以存储预先设置。选择菜单 310 上的摄像机按钮可以在屏幕 202 上引出对话，该对话列出了视频源（例如，摄像机、计算机等），以及用户可以触摸在列表上的适当按钮，以选择所期望的视频源。菜单 310 上的近端和远端按钮允许用户选择和控制在端摄像机（即，与视频会议单元（100）耦合的摄像机）、或者与视频会议的端点相关联的远端摄像机的一个或多个。

如先前所讨论的，图 3 的视频会议单元 100 还具有用于控制摄像机的摄像机功能 132。摄像机功能 132 的一部分包括：在显示设备 200 上显示摄像机控制，以及相对于那些摄像机控制，接收来自用户的触摸数据，以控制摄像机操作。参照图 6，在显示设备的触摸屏 202 上示出了由视频会议单元生成的摄像机控制 350 的实施例。摄像机控制 350 允许用户在屏幕 202 上使用直观触摸来控制摇镜头-倾斜-变焦摄像机。当正在屏幕 202 上显示全屏视频时，当笔或擦除器工具（242；

030



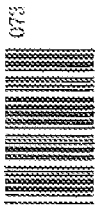
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图 1) 是放下的时触摸屏幕上的任何地方将引出在有效视频之上显示的水印网格 360。控制图标 364 和 368 位于水印网格 360 的区域 362 和 366 中。通过触摸与控制图标 364 相关联的网格 360 的上下区域 362 对, 用户可以使所连接的视频会议单元的摇镜头-倾斜-变焦摄像机、或者参与视频会议的远程端点的摇镜头-倾斜-变焦摄像机进行倾斜操作。通过触摸与控制图标 365 相关联的网格 360 的左右区域 363 对, 用户可以使所连接的视频会议单元的摇镜头-倾斜-变焦摄像机、或者参与视频会议的远程端点的摇镜头-倾斜-变焦摄像机摇镜头。通过触摸与其它控制图标 368 相关联的网格 360 的内部区域 366 对, 用户可以使所连接的视频会议单元的摄像机、或者参与视频会议的远程端点的摄像机进行变焦操作。

依据在屏幕 202 上当前正显示哪个视频, 来确定对与视频会议相关联的哪个摄像机(例如, 近端或远端)进行控制。例如, 如果与视频会议端点相关联的远端摄像机的视频当前正在屏幕上显示, 则触摸与网格 360 相关联的区域 362、363 和 366 将会使用这里公开的技术来控制远端摄像机的摇镜头、倾斜和变焦。如果当前正在显示与屏幕 202 相关联的视频会议单元连接的近端摄像机视频, 则触摸与网格 360 相关联的区域 362、363 和 366 将会使用这里公开的技术来控制近端摄像机的摇镜头、倾斜和变焦。

如先前所讨论的, 图 3 的视频会议单元 100 具有向所显示的视频添加注释的注释功能 133。参照图 7, 示出了在注释模式 400 中操作的视频会议系统 10 的一部分。在注释模式 400 中, 用户可以在当前正在屏幕 202 上显示的视频之上作出注释 410。可以使用电子笔 242 作出注释 410, 以及可以在开启或关闭有效视频会议呼叫时作出注释 410。如果用户想在屏幕 202 上所显示的对象 402 上(例如, 来自所连接的文档摄像机或计算机的显示文档)进行写操作, 则用户一从托盘 420 中拾取电子笔 242, 则视频会议系统 10 自动地进入注释模式 400。如先前所讨论的, 显示设备 200 的托盘 240 上的光传感器可以用于检测用户何时从托盘 240 中拾取笔 242。通过与视频会议单元 100 的数据接口, 从显示设备 200 中发送该数据, 其中, 在视频会议单元 100 中,



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单元 100 的控制器 (120; 图 3) 访问注释功能 (133; 图 3)。

在注释模式中, 用户能够在设备 200 的屏幕 202 上显示的多种视频或图像上作出注释 410。视频和图像可以包括来自视频会议单元 100 的视频会议视频、来自文档摄像机的视频、来自 VCR 或 DVD 播放器的视频、或者来自所连接的计算机的计算机屏幕图像。来自文档摄像机、VCR 和 DVD 播放器的视频可以符合国家电视标准委员会(NTSC)或逐行倒相(PAL)标准。计算机屏幕图像可以是具有 1024×768 分辨率的 XGA。

当在屏幕 202 上作出注释 410 时, 注释 410 的图形元素与所显示的视频组合。通过将注释 410 与所显示的视频组合, 易于将注释 410 作为在视频会议网络上从单元 100 发送至远程端点的压缩视频比特流的一部分, 发送至视频会议的远处端点。

在一个实施例中, 用户可以对计算机提供的内容作出注释 410。优选地, 对来自计算机的内容进行注释。内容可以是白色书写板、计算机屏幕、图像、或来自计算机的可视媒体的内容。例如, 计算机 (50; 图 2A-2B) 可以指定为在触摸屏设备 200 的屏幕 202 上显示的内容源。在视频会议期间, 用户可以从触摸屏设备 200 的托盘 240 中拾取用户工具 242, 以及视频会议系统 10 自动地切换至注释模式操作。一旦在注释模式操作中, 则计算机 (50) 接收来自触摸屏设备 200 的触摸数据, 并将所接收的触摸数据组合作为对计算机内容的注释。计算机 (50) 将该注释内容发送至触摸屏设备 200, 以显示该注释内容, 并将该注释内容发送至视频会议单元 100。视频会议单元 100 接收来自计算机 (50) 的注释内容, 并将所接收的注释内容通过单元的网络接口 (140; 图 3) 发送至视频会议的端点 (未示出)。因此, 可以对内容作出注释, 并通过网络自动发送至远端端点。

优选地, 发送注释内容包括将注释数据与内容数据组合在一起, 从而该组合可以通过网络按照 H.239 标准发送。此外, 利用计算机 (50) 处理显示在触摸屏设备 200 上的注释和内容, 可以避免常规上用户在视频会议期间作出注释时出现的时延问题。具体地, 利用计算机 (50) 来处理注释和内容不再需要视频会议单元处理注释内容、并将该注释

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说明书 第14/15页

内容发送至触摸屏设备 200 用于显示。典型地, 这种反馈设置在用户当前在显示设备 200 的屏幕 202 上作出什么注释与显示多少注释 410 之间产生时延。通常, 不希望有任何显著的时延。

如以上所讨论的, 图 3 的视频会议单元 100 还具有允许显示设备 200 用作白色书写板的白色书写板功能 134。参照图 8, 示出了在白色书写板模式 450 中操作的视频会议系统 10 的一部分。为了访问该模式 450, 用户从显示设备 100 的托盘 240 中拾取电子笔 242, 如果还未选择另一视频源 (例如, 文档摄像机、计算机、VCR、DVD 播放器等), 则视频会议系统 10 自动地进入白色书写板操作模式 450。然后, 用户可以在屏幕 202 上显示的白色书写板内容 452 上开始书写注释 460。优选地, 白色书写板内容 452 是具有  $1024 \times 768$  的分辨率的 XGA 图像。用户可以在白色书写板内容 452 上作出注释 460, 而不考虑系统 10 是否处于视频会议呼叫中。然而, 当处于视频会议呼叫中时, 可以将具有注释 460 的白色书写板内容 452 通过视频会议单元 100 发送至远程端点。

如先前参照图 2A-2B 所讨论的, 系统 10 可以不包括计算机。缺少计算机, 视频会议单元 100 可以自身生成白色书写板。当系统 10 当前正在显示设备 200 上显示图形用户界面或者摄像机的视频数据时, 视频会议单元 100 在用户从托盘 420 中拾取笔 242 时, 自动进入注释模式操作。在注释模式中, 视频会议单元 100 生成白色书写板内容 452。视频会议单元 100 接收来自显示设备的触摸数据, 并将触摸数据作为注释 460 组合到白色书写板内容 452。然后, 视频会议单元 100 将注释后的白色书写板发送至显示设备 200, 并将注释后的白色书写板作为 H.239 内容发送至视频会议的一个或多个远程端点。然而, 在可选实施例中, 系统 10 可以使用可选计算机 (50; 图 2A-2B) 来处理白色书写板内容 452 和注释 460, 从而视频会议单元 100 可以将注释后的白色书写板作为 H.239 内容发送至视频会议的一个或多个远程端点。

如先前所述, 可选计算机 (50; 图 2A-2B) 可以与系统 10 连接。从托盘 240 中拾取笔 242 可以使系统 10 自动地选出 VGA 或视频源,



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以在显示设备 200 上全屏显示并发送至视频会议的远程端点。例如，不是将白色书写板 452 作为显示的背景示出，而是可以示出来自可选连接的计算机（50）中的计算机屏幕。VGA 或视频源的选择依据系统 10 当前所选择的源。例如，可以通过集成到系统 10 的 A/V 控制器 150 来控制与视频注释相关的行为，以及 A/V 控制器 150 可以配置来提供这里公开的对视频进行注释和在源之间切换的特征。

优选的和其它实施例的前述描述并不意在局限或限制申请人构想的发明构思的范围或适用性。公开这里所包含的发明构思，以此易彼，申请人要求由所附权利要求提供的所有专利权。因此，所附权利要求意在包括对于落入所附权利要求及其等同物范围内的所有修改和改变。

20



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## 说明书附图

第1/5页

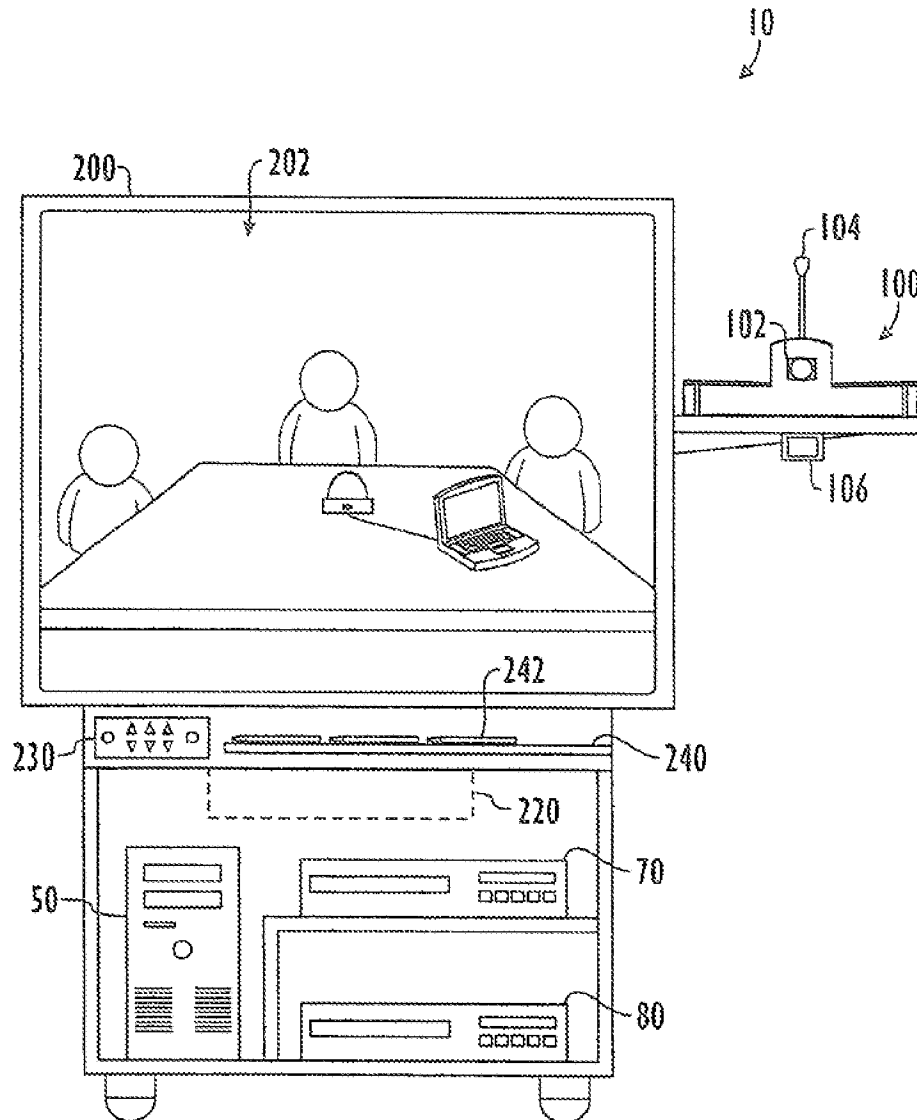


图 1

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说明书附图 第2/5页

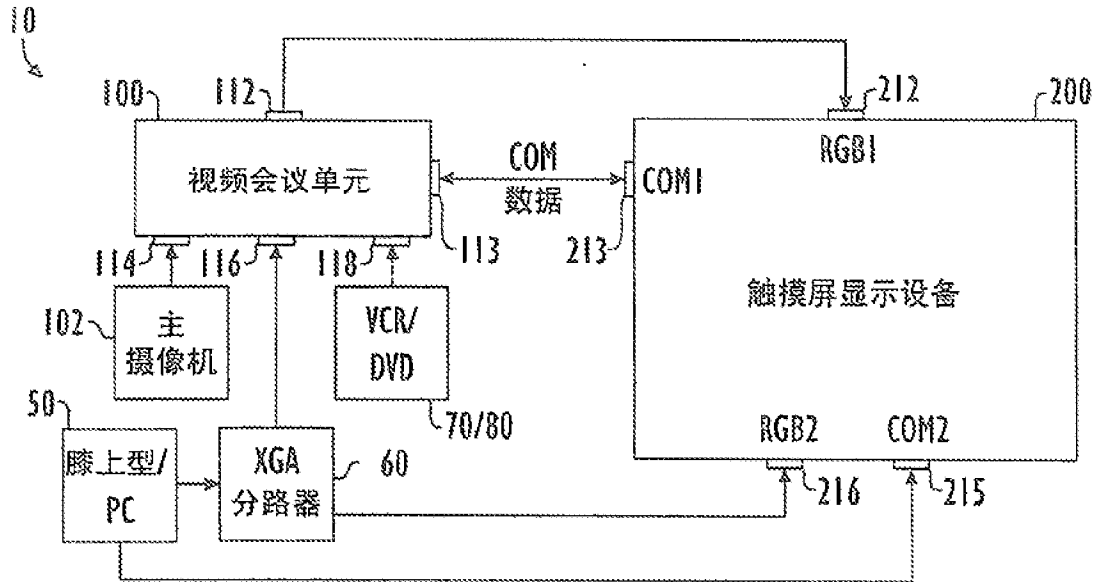


图 2A

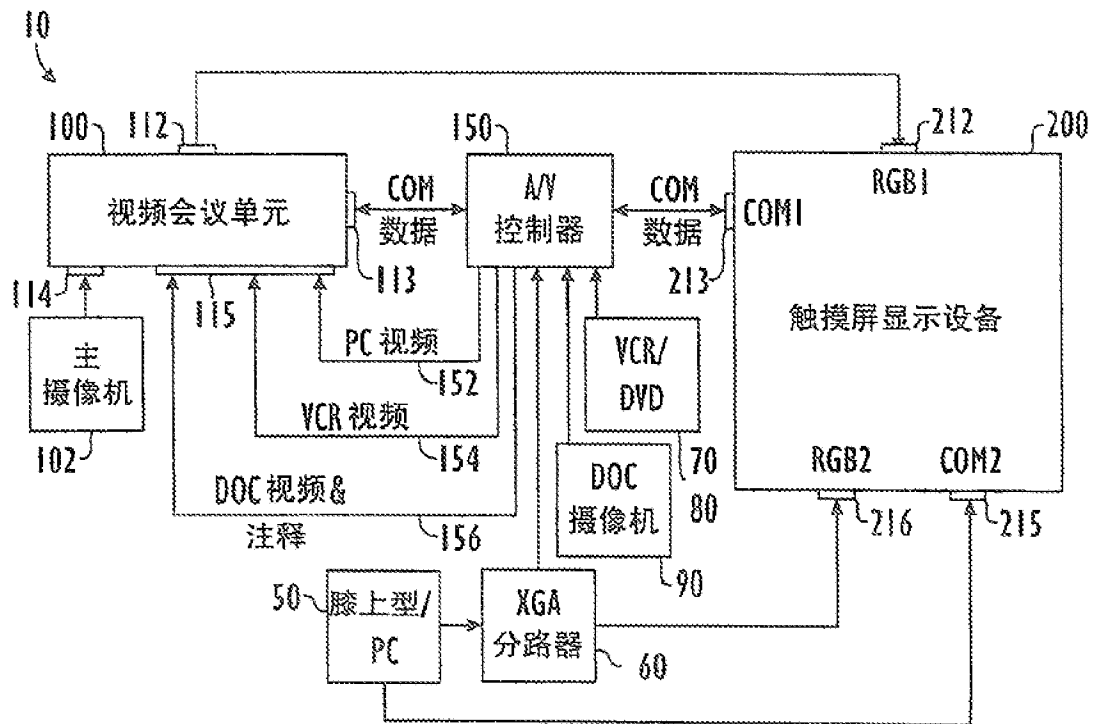


图 2B

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说明书附图 第3/5页

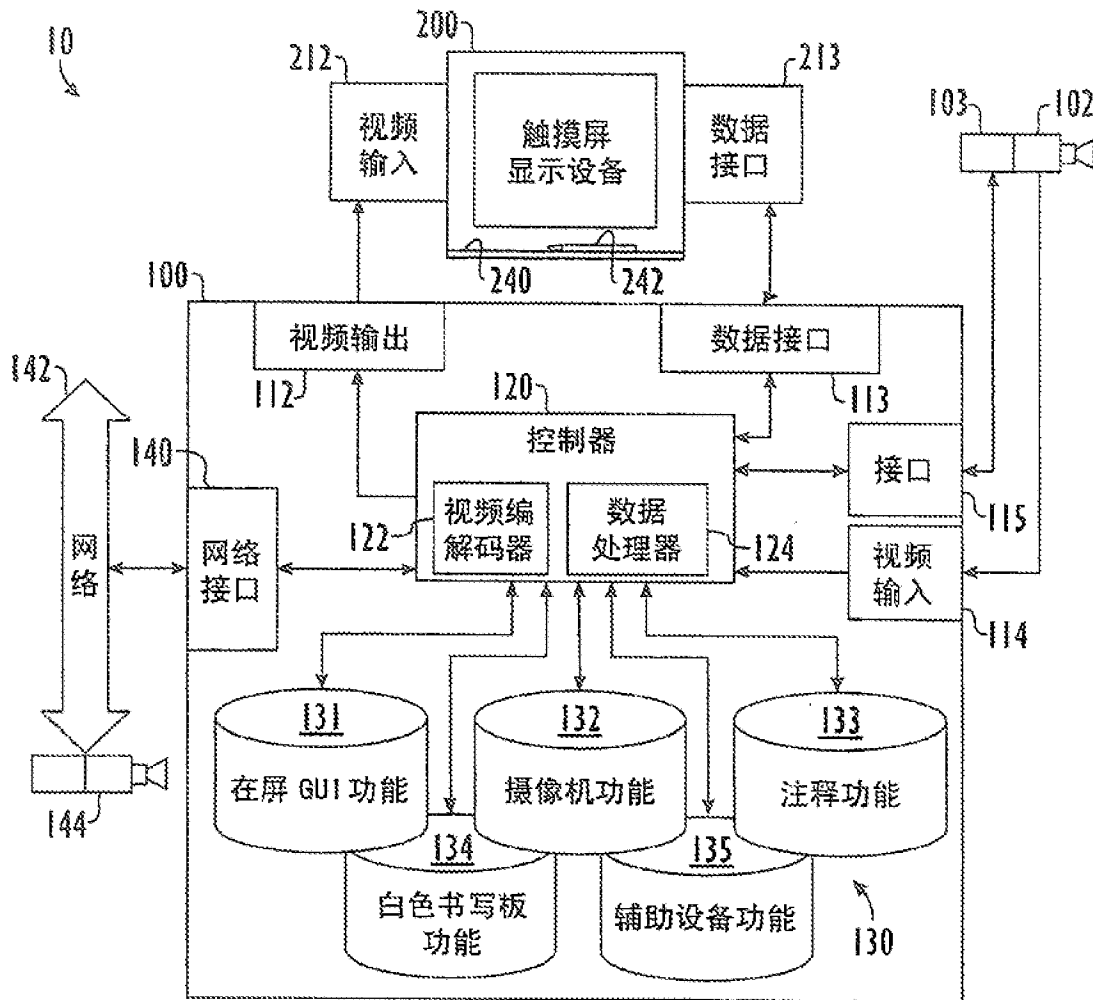


图 3

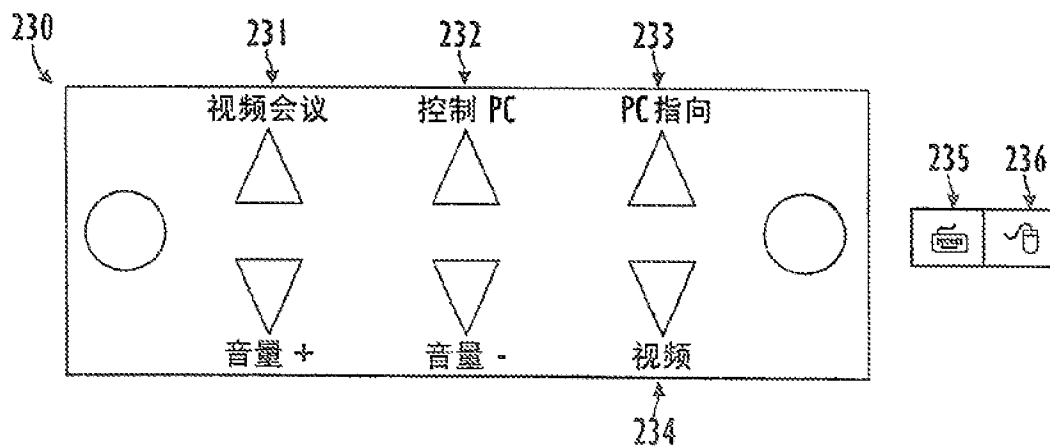


图 4

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说明书附图 第4/5页

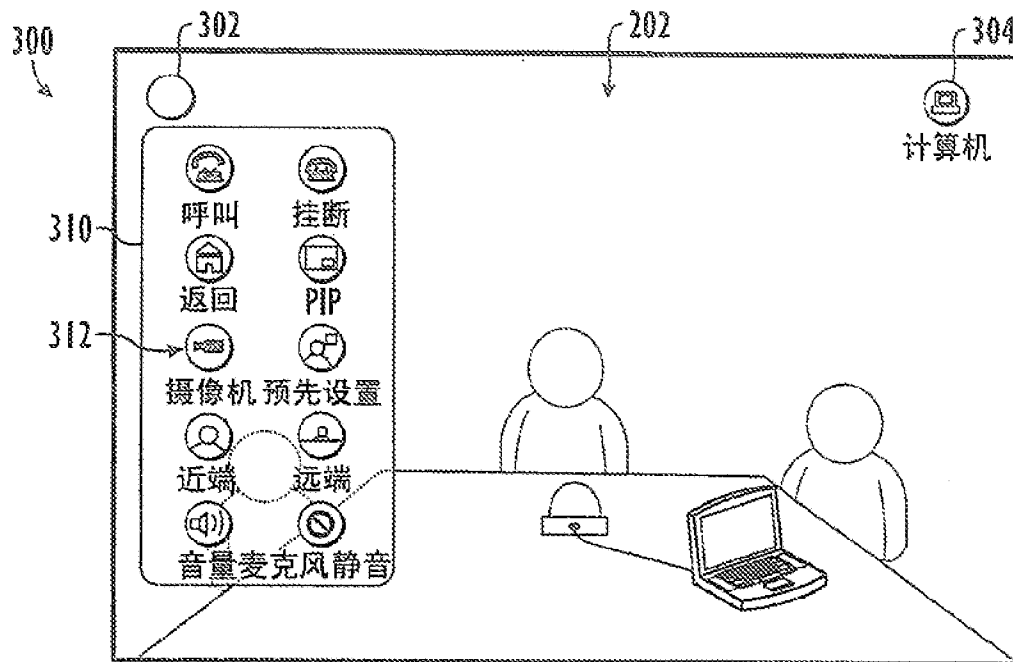


图 5

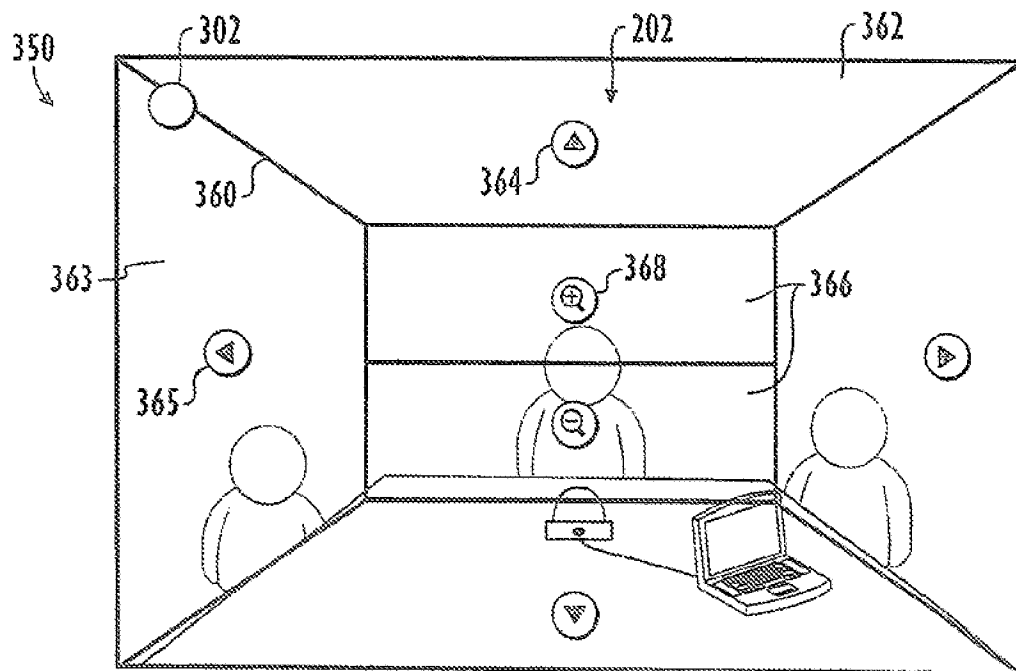


图 6

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说明书附图 第5/5页

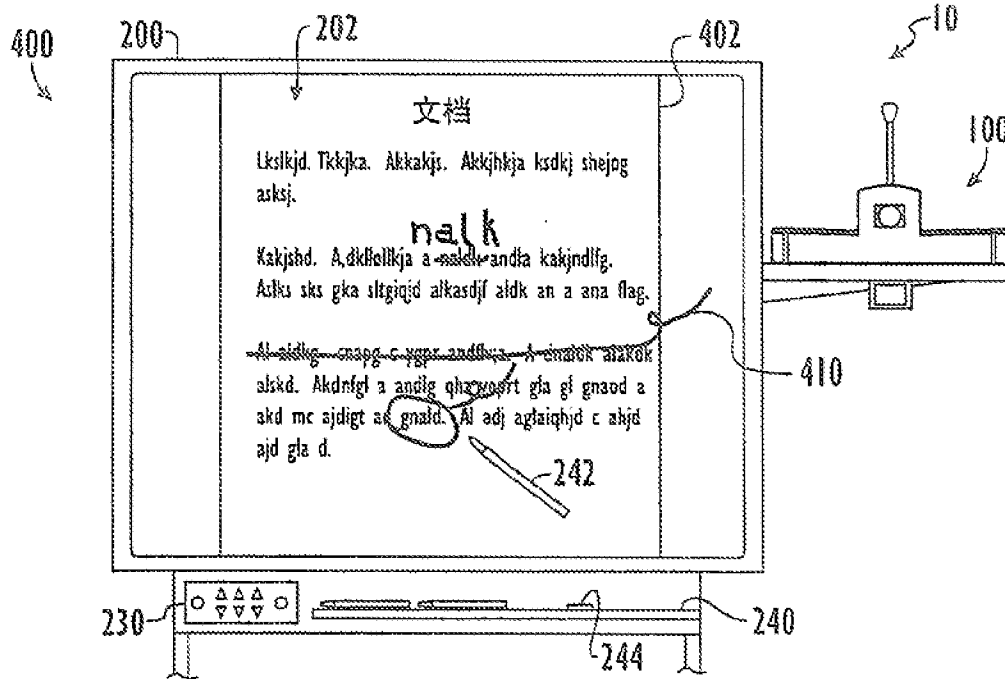


图 7

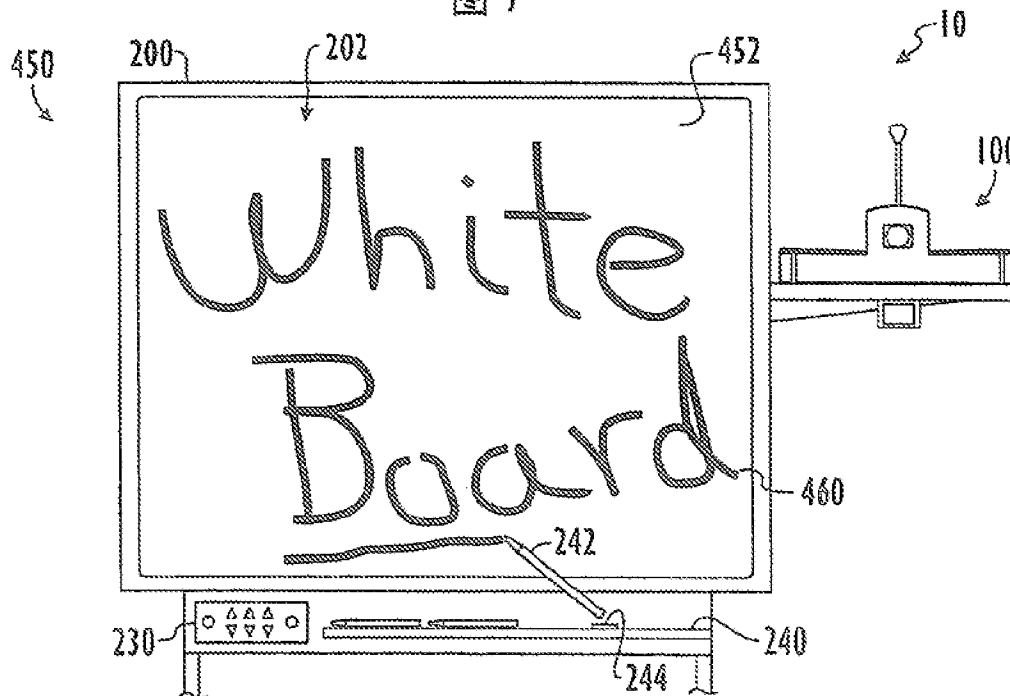
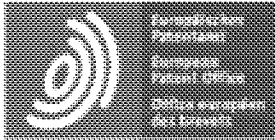


图 8



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## Notice

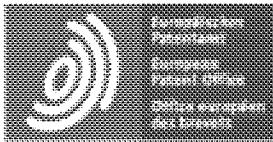
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## ABSTRACT CN101542459A

[1]

13 Embodiments provide a shared space for communicating information. In an embodiment, multiple users associated with a computing environment may use a shared space to communicate information with each other. Each computing device of the computing environment may include a shared space application. The shared space application includes a plurality of interactive tools that can be used to persistently store various communications between associated computing devices of the computing environment.





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## DESCRIPTION CN101542459A

*10* Shared space for passing information

[0001]

*14* background

[0002]

*18* People try to communicate and stay connected using a variety of communication methods, such as mail, phone calls, digital photos, whiteboards, email, instant messaging (IM) applications.

*20* However, each technology has associated limitations and can lead to an unsatisfactory user experience. For example, instant messaging, networked digital photo frames, and e-mail may be out of date and constrain the amount of information that can be delivered. Certain communication methods like telephony and IM communication can be intrusive by forcing a party to respond in real time. Passive communication methods like email and mail communication allow for delayed responses, but are generally less intrusive because one party can wait for a response. However, passive approaches can be impersonal and insufficient in emotional expressiveness because they utilize turn-based systems (eg, email and instant messaging) that employ a statement/reply/statement/reply communication structure.

[0003]

*31* Other communication methods lack fidelity, expressiveness, or are limited to providing information in ad hoc conversations (eg, instant messaging, virtual whiteboards).

*33* Once the session ends, the information is lost. For example, whiteboards are often used as a medium to convey spontaneous handwritten ideas and concepts. However, the information displayed on the whiteboard is not ideal for remote interaction and collaboration. Due in part to limitations associated with video teleconferencing equipment, it is difficult for remote users to read and focus on relevant portions of the whiteboard. For example, ink strokes written on a whiteboard may be difficult to see and may not be erased or

edited by a remote user. Therefore, real-time multi-user physical whiteboard collaboration is limited and often an unsatisfactory experience for remote participants.

[0004]

43 Overview

[0005]

47 This summary is provided to introduce some concepts in a simplified form that are further described below in the Detailed Description.

49 This Summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter.

[0006]

54 Embodiments provide a "shared space" for communicating information.

55 The shared space may be configured to allow multiple users to communicate using the shared space.

56 In one embodiment, the shared space application is configured to provide a persistent space that can be shared and interacted by two or more users.

58 Users may have multiple separate spaces to share and communicate with other individuals and/or groups.

59 In various embodiments, a shared space can be populated and interacted with using a flexible collection of simple communication tools for sharing and communicating various information.

61 The communication tools and shared spaces provide users with a persistent means of interacting and communicating naturally and conveniently.

[0007]

66 These and other features and advantages will be apparent from a reading of the following detailed description and a review of the associated drawings.

68 It is to be understood that both the foregoing general description and the following detailed description are illustrative only and do not limit the invention as claimed.

[0008]

73 Brief Description of Drawings

[0009]

77 1 is a block diagram of a computing environment.

[0010]

81 2 is a block diagram of a computing environment.

[0011]

85 3 is a block diagram of a shared space architecture.

[0012]

89 FIG. 4 is a flowchart illustrating the use of a shared space.

[0013]

93 5A-5K illustrate user interfaces for interacting with a shared space.

[0014]

97 6 is a block diagram illustrating a computing environment for implementing various embodiments described herein.

[0015]

102 A detailed description

[0016]

106 Embodiments provide a shared space that multiple users can use to communicate information.

107 The shared space may be configured to allow multiple users to communicate using the shared space.

108 In one embodiment, the shared space application is configured to provide a persistent space that can be shared and used by two or more users to communicate using various tools.

110 The display of the computing device may be used to present the shared space to users using the shared space application to share this space.

112 Users can interact with the shared space in real-time or at their convenience using the various tools provided by the shared space application.

[0017]

117 In one embodiment, multiple shared spaces may be presented on one or more displays, allowing a user to interact with various individuals and/or groups simultaneously.

119 That is, users may have separate spaces to keep in touch and communicate with different individuals and/or groups.

121 In various embodiments, the shared space may be populated with a flexible collection of simple

communication tools that allow sharing of various information.

123 For example, a user may use a communication tool to populate a shared space with images, text, audio, hand-drawn and handwritten text (eg, digital ink), and/or other data.

125 These communication tools are configured to provide natural and convenient communication and interaction.

[0018]

130 In one embodiment, the shared space is persistent and always remains available to the associated participant, even when the participant is not using the space and/or not logged in (eg, offline).

132 Users can invite one or more participants to share one or more spaces.

133 Participants in a shared space may add to, delete from, and/or otherwise modify the space.

134 Thereafter, all participants of the shared space see or will see the same result of the interaction.

135 The Shared Spaces application is configured to allow participants to save content to a private scrapbook, as the nature of Shared Spaces can be highly transient.

137 Additionally, shared space applications are configured to use shared and proprietary data, but are not so limited.

139 In one embodiment, the shared space application is also configured to enable "live connections".

140 The live connection enables multiple participants to participate in live audio and/or video communications using the shared space application.

[0019]

145 FIG. 1 is a block diagram of a computing environment 100 under one embodiment.

146 Computing environment 100 may be described as a network of components, where associated components are communicatively coupled in a manner that provides operational functionality.

148 A plurality of computing devices 102-106 communicate with each other to provide a network of computing devices.

150 The plurality of computing devices 102 - 106 may also communicate with the serving computing device 107 .

151 Each computing device 102-107 includes networking and security components configured to provide communication functionality between the computing devices 102-107.

153 Computing devices 102-106 may include desktop computers, laptop computers, tablet computers, handheld devices, and other communication devices.

[0020]

158 As shown in FIG. 1, each computing device 102-106 includes a shared space application 108-112, described in detail below.

160 The service computing device 107 includes, but is not limited to, the space manager component 114 .

161 The space manager component 114 may be configured and used to manage aspects of one or more shared spaces, but is not so limited.

163 For example, the space manager component 114 may maintain read-write master data files associated with the

shared space.

165 In one embodiment, each of the shared spaces 108-112 and the space manager component 114 includes a software application that executes in conjunction with the processors of the computing devices 102-107.

167 As described below, each shared space application 108-112 is configured to provide persistent space to a plurality of users associated with the shared space.

169 To simplify the following discussion, reference is made to computing device 102 and the associated shared space application 108 in describing the functionality and use of the shared space application.

#### [0021]

174 As described below, a user may use the computing device 102 and associated shared space 108 to communicate and interact with other users of the shared space.

176 A shared space can be described as a persistent canvas or interactive window that can be used by one or more users to communicate in various ways.

178 That is, the shared space application 108 is configured to persistently store user interactions, including various expressions, with respect to an associated shared space.

180 Accordingly, all users associated with the shared space, regardless of their physical location, see the user interaction.

182 In various embodiments, any content (ink, video files, audio files, text, pictures, etc.) created, placed, or otherwise located in the shared space is persistently stored in the shared space until deleted or otherwise modified.

#### [0022]

188 A user may use the shared space application 108 to interact with multiple separate spaces and/or users.

189 For example, a user may use the shared space application 108 to create multiple shared spaces that enable the user to stay in touch with various individuals and/or groups.

191 A user's interaction with a shared space is called an expression.

192 The shared space application 108 is configured to persist the expression in the shared space until the expression is deleted or otherwise modified by a user associated with the shared space.

194 For example, if a user draws a picture or posts a photo in a shared space, the item remains in the shared space even if it is covered by other items.

#### [0023]

199 The shared space application 108 may be installed on the computing device 102 .

200 For example, the shared space application 108 may be installed as part of an operating system (OS) installation process.

202 As described above, a user may use the shared space application 108 to communicate with one or more users or participants of a shared space.

204 Additionally, the delivery of the shared space may be provided to multiple associated computing devices.

205 The communication of a shared space to multiple computing devices makes collaboration and interaction a

joyful experience even for users in remote locations.

207 Accordingly, the shared space application 108 provides businesses, families, friends, and other parties with a convenient medium for communication interactions.

[0024]

212 For example, delivery of a shared space may be provided to multiple ultra-mobile computing devices and associated users communicating over a network such as the Internet.

214 In one embodiment, the delivery of the shared space is provided over the Internet using an online file storage service.

216 In another embodiment, the delivery of the shared space is provided to multiple computing devices using a peer-to-peer service, such as, for example, a peer-to-peer synchronization service.

[0025]

221 Delivery of the shared space may be provided to computing devices 102-107 of a computing network, such as a wireless local area network (WLAN), local area network (LAN), wide area network (WAN), a combination thereof, and/or some other type of computing and/or or communication network.

224 In one embodiment, computing environment 100 is a distributed computer network that allows one or more computing devices, communication devices, databases, etc. to communicate according to a desired implementation.

[0026]

230 The components of computing environment 100 may be communicatively coupled to each other using wired, wireless, combinations of wired and wireless, and other communication technologies.

232 The delivery of the shared space may also include a combination of various communication methods.

233 Other examples of delivering shared spaces include file/folder sharing methods and/or synchronization schemes.

235 For example, a file/folder sharing program such as FOLDERSHARE (folder sharing) can be used to deliver the shared space and associated displayed content.

[0027]

240 In an embodiment, the shared space application 108 is configured to manipulate, persistently store, and/or display the contents of a master file, such as, for example, a read-only copy of the master file.

242 The master file may be updated when the shared space is modified or otherwise changed.

243 That is, the shared space application uses the master file to track and maintain changes to the shared space.

244 In one embodiment, a master file is associated with each shared space.

245 Each computing device 102-106 may use the master file to display the contents of the shared space, including recent changes and modifications to the shared space.



[0028]

250 In one embodiment, each computing device 102-106 is associated with a peer-to-peer network and uses a master file associated with the shared space.

252 When the computing devices 102-106 associated with the shared space are connected and online, the master data file changes state from read-only to read-write.

254 Thereafter, the local master data files are synchronized in real time as additions, deletions, and other changes are made to the associated shared space.

256 When the computing device is disconnected (eg, the user is offline), the local master data file is reconfigured to be read-only.

258 Thereafter, the next time the user logs into the shared space and the shared space application 108 connects to the read-write master file, the read-write master file is copied over (eg, replacing) the local read-only master file so that all read-only master files can be used while the user is disconnected. All additions and changes made to update the master file.

[0029]

266 Thus, as updates to the shared space occur, each master file is updated and/or synchronized with other associated master files for that shared space.

267 Thus, the shared space application 108 is used to ensure that users currently communicating with each other (eg, connected or logged in) see the same information.

269 The shared space application 108 is configured to modify the master file, and the delivery of the shared space is provided by using the master file when the user communicates with another participant and the associated master file.

272 For example, delivery of the shared space may be provided when the user has a connection to the associated master file and/or directly to another associated computing device (eg, peer-to-peer) through an online storage service.

[0030]

278 As described above, the shared space application 108 may be configured to maintain a read-only copy of the last version of the master file in the local storage of the associated computing device.

280 If the user is offline, the shared space application 108 does not provide access to read-only master files.

281 However, the user can view the read-only copy of the master file, but cannot make changes to the master file.

282 As described below, the user can also save one or more expressions stored in this read-only master file to the clipboard.

284 If another user changes the home file associated with a shared space while a user is offline, the offline user will not see those changes until they log back into the associated shared space.

286 Therefore, the user must log into the shared space so that the shared space application 108 can access and use the read-write master file to update the shared space with any changes since the user was offline.

[0031]

291 As an example, assume that User A and User B own a shared space.  
292 User A is online.  
293 When user A opens the shared space, the shared space application accesses the main file.  
294 As an example, a shared space application may access home files from a virtual hard drive.  
295 Subsequently, user A adds a picture to the shared space.  
296 The Shared Spaces application adds pictures to the main file and to User A's local read-only file.  
297 User B is offline and the shared space is opened, which shows that User B is offline.  
298 User B cannot see the picture that User A just added.  
299 Thereafter, user B goes online, eg. connected to the Internet.  
300 Once User B is online, the shared space application accesses and reads the master file and updates the local  
read-only file on User B's machine.  
302 Now user B sees the picture that user A added to the shared space.

[0032]

306 In one embodiment, the read and write master files are stored and maintained on the serving computing  
device 107 .  
308 Therefore, users associated with a shared space need to have a network connection and be online to make  
changes to the shared space and associated read-write master files.  
310 In other embodiments, master files may be stored and maintained on peer machines and/or users' computing  
devices using web services.  
312 Then when all the participants associated with the shared space are communicating, the master file can be  
copied to all the participants.  
314 In an alternate embodiment, the user can make additions and/or changes to his local files at any time.  
315 Thereafter, when each participant reconnects to the shared space (eg, logged in) or connects to another  
participant (eg, peer-to-peer), a synchronization is performed to aggregate all offline changes made by each  
participant so that each participant The person "sees" the same space.

[0033]

321 FIG. 2 is a block diagram of a computing environment 200 under one embodiment.  
322 Computing environment 200 includes computing device 202 in communication with serving computing  
device 204 .  
324 The components of computing environment 200 may be communicatively coupled to each other using wired,  
wireless, combinations of wired and wireless, and other communication and networking technologies.  
326 Although one computing device 202 and one computing device 204 are shown, other embodiments may  
include multiple such computing and serving computing devices.  
328 In an embodiment, a shared space may be created and defined between at least two users using two computing  
devices, such as ultra-mobile computing devices.



[0034]

333 As shown in FIG. 2, computing device 202 includes shared space application 206.

334 The shared space application 206 is configured as a persistent space that can be shared by multiple users for interaction.

336 According to this embodiment, the shared space application 206 includes a number of associated components for maintaining the space.

338 Shared space applications 206 include, but are not limited to: launch component 208; authentication component 210; contacts component 212; canvas dispatch component 214; media recorder component 216; frame capture component 218; history/clipbook manager component 220; Program component 222; content object creator component 224; data synchronization program component 226; file creator component 228; response/request handler component 230;

343 In various alternative embodiments, the functions and operations of the various components may be combined to provide fewer components and/or required implementations.

[0035]

348 Activation component 208 can be configured as a user interface and used to provide user authentication, space selection and/or participant selection, and authentication component 210 can be configured and used as an authentication service, such as a PASSPORT service.

351 Contacts component 212 may be configured and used to locate and/or maintain a user contact list.

352 For example, the contacts component 212 can be configured to connect to an MSN service to present a list of MSN contacts of users who are participants in the shared space.

354 The canvas dispatch component 214 can be configured and used to create a new space canvas and display objects in the space.

356 The media recorder component 216 may be configured and used to record audio, images, video, and other objects/expressions.

358 For example, the media recording program component 216 may use local cameras, microphones, and/or other components to record images, audio, and video as representations in space.

[0036]

363 With continued reference to FIG. 2, the frame capture component 218 can be configured and used to capture a "snapshot" image of the space for history and/or scrapbooking.

365 History/Scrapbook Manager Component 220 may be configured and used to manage a chronological collection of "snapshots" of a space and provide the user with reviewing selected expressions and/or storing them in a private local storage known as a scrapbook mechanism in the library.

368 The history/clipbook manager component 220 can record every event that occurs in the space.

369 Therefore, the user does not have to constantly use the save operation, which allows for a more informal interaction with the space.

371 The space manager component 222 may be configured and used to manage various aspects of the space.

372 For example, space manager component 222 may be configured and used to manage local copies of master files.

374 The content object creator component 224 may be configured and used to manage objects and other representations in the space.

376 For example, content object creator component 224 may be configured and used to manage images, ink, text, and/or other user expressions.

[0037]

381 The data synchronization program component 226 may be configured and used to synchronize data files between the user computing device 202 and the serving computing device 204 .

383 For example, the data synchronization program component 226 may be configured and used to synchronize master data files between the user computing device 202 and the serving computing device.

386 The file creator component 228 may be configured and used to manage shared space data files, including but not limited to: creating, opening, and saving shared space data files.

387 The response/request handler component 230 may be configured and used to manage communications between computing devices.

389 For example, response/request handler component 230 may be configured and used to manage communications between computing device 202 and serving computing device 204 .

391 The space canvas component 232 can be configured and used as a user interface that enables user interaction with the space.

[0038]

396 According to this embodiment, the service computing device 204 includes a plurality of shared space components.

398 As shown in FIG. 2, the serving computing device 204 includes, but is not limited to: a data synchronization program component 234; a response/request handler component 236; and a space management program component 238.

401 The data synchronization program component 234 may be configured and used to synchronize data files between the serving computing device 202 and one or more user computing devices.

403 For example, data synchronization program component 234 may be configured and used to synchronize master data files between serving computing device 204 and user computing device 202 .

405 The response/request handler component 236 may be configured and used to manage communications between a serving computing device and one or more other computing devices, including with other serving computing devices.

408 The space manager component 238 may be configured and used to manage various aspects of the space.

409 For example, space manager component 238 may be configured and used to manage read-write master copies of master files.

411 Other embodiments are also available.

[0039]

415 The shared space application 206 is configured to use and provide various objects in the shared space.

416 In one embodiment, the shared space application 206 uses and provides: participant indicators (eg, icons, digital images, etc.) representing other users who are sharing a space; expressions in the space (eg, ink, text, photos, videos, live connections, etc.); and multiple interactive tools.

419 For example, icons (eg, default people or group icons) or digital images may be used to represent individuals or groups that are sharing a space.

421 Digital images or photos can be imported or discarded using the contacts component 212 along with a name or group name associated with the individual.

423 Contacts component 212 may be configured to propagate name/photo updates/changes to shared space application 206 .

425 Individual participant indicators may include indications of participant status or status (eg, present, busy, absent, etc.).

427 The group participant indicator may also include a count of participants in each state (4 out of 12 present, etc.).

429 As described below, when the user taps a participant indicator, a live connection (eg, audio and/or video - depending on available device hardware and service features) is established.

[0040]

434 Expressions include any items that participants create in the space, including ink, images, text, video, live connections, and more.

436 For example, participants can use a graphics tablet pen to draw a picture or write some text.

437 For example, users can also use their fingers and a touchscreen to write ink in space.

438 In one embodiment, the expression may include 3 states: normal, focused, and magnified, but is not limited thereto.

440 In the normal expression state, new expressions appear on top of old expressions (except for live connections, which always appear on top).

442 A previously maintained live connection may be represented by a live connection indicator such as a live connection icon.

444 Text expressions can be scrolled by touching and dragging up and down in the text area.

445 Focusing an expression (or expression group) in a shared space displays a marquee around the item.

[0041]

449 Table 1 below lists the various expressions and how each expression received focus.

[0042]

453 Table 1

[0044]

457 In the focused state, individual expressions (single selection) or groups of expressions (group selection) can

have focus.

459 When an expression (or group of expressions) has focus, it is temporarily displayed on top of other expressions, including surrounding marquees, zoom buttons, and movement handles.

461 Losing focus returns the expression (or group) to its previous position in viewing order.

462 The user can drag the marquee to move the representation (eg, drag from the center or move handle), resize the representation (eg, drag from the edges and corners), and rotate the representation (eg, drag the move handle or rotation handle).

#### [0045]

468 In one embodiment, any changes to the representation (eg, moving, resizing, rotating) are used to move the changed representation to the top of the viewing order.

470 Changing the focus on an expression without making any changes to the expression is used to return the expression to its previous position in viewing order.

472 The user can clear focus by tapping an empty area of the shared space or selecting another expression.

473 Expressions pasted into the shared space are automatically given focus.

#### [0046]

477 The user can tap a zoom-in button for changing the presentation view to a zoomed-in state.

478 In the magnified state, the representation is magnified to encompass a substantial portion of the display (tools remain visible).

480 In the magnified state, the representation cannot be moved, resized, or rotated.

481 The user can hit the close button that returns the expression to the focused state.

#### [0047]

485 Table 2 below lists a number of contextual controls and information associated with each expression.

#### [0048]

489 Table 2

#### [0051]

493 The tools of the Shared Spaces application are configured to facilitate the sharing of photos, video, audio, ink, text, and other user expressions.

495 These tools can be used to create, select, modify and save representations.

496 In one embodiment, these tools are provided via the spatial canvas component 232 and are configured as buttons (eg, touch screen buttons, tablet buttons, icons, etc.).

498 Button types include, but are not limited to: Toolbox tray buttons: expand/collapse the toolbox tray; toolbox buttons that select a tool and then collapse the toolbox tray; activate controls (for modal buttons) or

expand/collapse palettes (for palettes ); and a palette button to select an item/mode/select from a palette and close that palette.

502 The appearance of tool buttons can be changed to reflect the current palette selection.

[0052]

506 Table 3 below shows each toolbox, tool and palette under one embodiment.

[0053]

510 table 3

[0056]

514 The shared space application 206 and associated tools allow participants to interact with the space and locate expressions at any desired location in the space.

516 Furthermore, space participants are free to interact with the space at their convenience.

517 There are no rigid communication requirements or protocols (eg, User 1 communication followed by User 2 communication followed by User 3 communication, etc.).

[0057]

522 As described above, the shared space application 206 is configured to provide live connections between the various participants of the shared space.

524 In one embodiment, the live connection is configured to be equivalent to an expression with a few exceptions.

525 A live connection can be used to participate in (and store) a live audio/video session (eg, like a video conference), or to record a message to another participant (eg, like an audio mail or video mail).

527 In either case, the methods and controls are the same.

528 Upon opening a live connection by tapping the participant icon, the user is prompted to select a type of live connection.

530 The type of live connection depends on the type of service subscription.

[0058]

534 Table 4 below lists subscription types for live connections of an embodiment.

[0059]

538 Table 4

[0061]

542 Live connections are configured to provide both local ("me") and remote ("you") views.  
543 In a group live connection, each member of the group has a "you" view.  
544 While opening a live connection, several controls and information are provided.  
545 Provides duration information to show the duration of the live connection (eg minutes:seconds).  
546 Provides (both audio and video) a mute button for muting the device microphone and camera so that others  
cannot hear or see you.  
548 The close button, when tapped, prompts the user to choose Cancel, Hold, or Erase.  
549 Select Cancel to return to the live connection as if the close button had not been hit.  
550 Selecting Keep places the live connection in the associated space, represented by a live connection icon.  
551 Select Wipe to discard the cached live connection.

[0062]

555 Shared space application 206 is also configured to provide scrapbooks using history/clipboard manager  
component 220 .  
557 Scrapbook provides convenient private storage for expressive and spatial snapshots.  
558 Scrapbooks can be opened by tapping the Scrapbook tool.  
559 The scrapbook is configured to provide multiple views (eg, lists, icons, thumbnails, etc.) and grouping/sorting  
(eg, by participant, by date, by expression type, by location, etc.).  
561 The scrapbook also includes search/filtering tools for locating expressions and other items in the scrapbook.

[0063]

565 Any expression or spatial snapshot can be stored in the scrapbook.  
566 The Scrapbook includes a "Save Space" button for saving a snapshot copy of the current space as an image in  
the Scrapbook.  
568 The contents of the scrapbook are stored in a folder called "My Scrapbook" in the operating file system.  
569 "My Scrapbook" is the equivalent of "My Pictures", "My Notes" and "My Music".  
570 A "My Scrapbook" folder can be created when the Shared Spaces application is installed.  
571 Expressions in clipboard also have 3 states (normal, focused, zoomed in) and also all corresponding controls  
and their behavior in space, except the following controls are changed and added: move, resize, rotate not  
available ; "Save copy to clipboard" is replaced by "Copy to Space"; "Print" button prints an expression or  
space snapshot.

[0064]

578 The Get Materials toolbox is configured to provide a convenient way to browse items and import items into a  
space from the operating file system.  
580 The Get Materials toolbox can be used to browse and import projects from various folders such as My  
Pictures, My Videos, and My Music.  
582 Tap the My <Material> tool from the Get Materials toolbox to open a viewer that browses the contents of the  
corresponding <Material> folder in the operating file system.



584 Multiple views (eg, lists, icons, thumbnails, etc.) and grouping/sorting (eg, by participant, by date, by  
expression type, by location, etc.) are provided.

586 Search/filter tools are also provided.

587 The expression also has 3 states (normal, focused, zoomed in), and also all corresponding controls and their  
behavior in space, except the following controls are changed and added: move, resize, rotate not available;  
"will "Copy to clipboard" was replaced by "Copy to Space".

[0065]

593 Shared space application 206 is also configured to provide history using history/clipbook manager  
component 220 .

595 In one embodiment, the history is maintained in and accessed from the serving computing device 204 .

596 History can be configured as a simple read-only temporary view of the space.

597 In one embodiment, the spatial history can be displayed full screen, with the following controls: individual  
selection (default); group selection (bounded representation); and copy.

599 In another embodiment, the history may be displayed as a list, thumbnails, or the like.

600 The history view includes a horizontal scroll bar that can be used to control time (eg occupying tool tray  
space).

602 The expressions in the history also have 3 states (normal, focused, zoomed in), and also all the corresponding  
information displayed, but without any modification controls.

604 Also, "save a copy to clipboard" was replaced by "copy to space".

[0066]

608 In one embodiment, the shared space application 206 may be configured to provide three interfaces for  
accessing automatically stored strokes, segments, and other expressions.

610 The first is infinite undo and redo.

611 Using undo and redo, the user can access any past state of the fragment.

612 The second is the time slider.

613 Using the time slider, the user can directly specify time points, or use the jump buttons to reach discrete  
"interesting" time points.

615 The third is context-based search, which can be implemented as behavior.

616 The search behavior allows users to retrieve previous strokes, segments, and other expressions based on  
contextual information such as time, segment, location, segment size, ink color, etc.

618 The search results are shown on the screen as a set of thumbnails, and the user can click on the thumbnails to  
access points in the history.

[0067]

623 FIG. 3 is a block diagram of a shared space architecture 300 under one embodiment.

624 Shared space architecture 300 may be configured as a layered architecture including core layer 302 .

625 The core layer includes a service and configuration component 302a, an event handling component 302b, and

a display context component 302c.

[0068]

630 Model layer 304 defines the basic interface for documents, user interfaces, tools, and interaction styles.

631 The model layer 304 includes a spatial model component 304a, a user interface model 304b, a tool model 304c, an interaction component 304d, and a physics component 304e.

633 Model layer 304 includes abstract interfaces and abstract classes that define shared space components.

634 Model layer 304 may be separated from generic layer 306 to ensure extensibility, flexibility, reusability and interoperability of modules and components.

[0069]

639 The space model component 304a defines the base classes and object functions that can be part of a space.

640 User interface model 304b defines alternative user interface concepts suitable for roomware components.

641 The tool model 304c provides additional functionality to the space.

642 Prominent examples are toolbars or browsers.

643 The space browser has the role of providing a connection between the user interface and the space.

644 Additionally, the tool model 304c controls possible modes of operation, such as the degree of coupling.

645 A physical model is a representation of the parts of the "real" world associated with a shared space.

646 For example, the term "station" refers to a computer running a shared space application.

647 Interaction component 304d supports different styles of interaction, including defining different interaction styles.

[0070]

652 The general layer 306 may provide functionality for interaction and communication, such as teamwork, meetings, and other situations.

654 The general layer 306 includes a link and reference component 306a, a display area component 306b, a toolbar component 306c, a click component 306d, a drag and drop component 306e, a space component 306f, an interaction component 306g, a browser component 306h, a gesture component 306i, and a station component 306h.

658 The general layer 306 includes standard data types like text, graphics, and informal handwriting input, as well as private and public workspaces for, for example, general collaboration support.

[0071]

663 Instances of hypermedia data model classes are included as part of the shared object space.

664 Therefore, users can access these objects at the same time.

665 Common document elements include workspaces (the equivalent of pages), handwriting (doodles), text, and images.

667 The main elements of the user interface include fragments and overlays.



668 Interactions can be divided into "segments" that define the space available to tools such as the document browser.

670 In addition, the "cover" can be placed freely.

671 The document browser and toolbar are provided by the common layer 306 .

[0072]

675 For interaction with the various components, there are available interaction techniques other than using the mouse and keyboard.

677 These techniques include gestures for writing with a pen or finger, as well as support for drag and drop.

678 To generate the gesture events described above, each stroke drawn can be sent to a gesture recognition program.

680 The shared space architecture 300 also includes a base layer 308 having a synchronization component 308a, a replication component 308b, an authentication component 308c, and a security component 308d.

[0073]

685 Figure 4 is a flow diagram illustrating a process for using a shared space application under one embodiment.

686 As mentioned above, a shared space can be shared between two or more users.

687 As the users are online and the corresponding computing devices communicate with each other, the shared space can be updated according to any participant changes.

689 As described above, once a user becomes a participant in a shared space, the user can interact and communicate with one or more other participants in the shared space in various ways.

[0074]

694 At 400, a shared space application is installed on a user's computing device.

695 At 402, the user is prompted to register prior to using the shared space application.

696 Profile information associated with the user is collected and can be stored on the serving computing device or locally as part of the registration process.

698 At 404, after registration, the registered user can create or join a space to share with other registered users.

699 Each space can have a unique name that identifies the space.

700 After a space is created, the space originator can invite multiple other users to join the created space.

701 The user may use a repository of contacts (eg, messenger contacts ("buddies"), OUTLOOK contacts, WINDOWS VISTA contacts, etc., or a collection of contacts) to identify potential users to share the created space.

704 Once the user has invited another user to join the space, the shared space application is configured to send an invite message to the invitee.

706 The invitee may receive the invitation message via email, IN, SMS, the shell application on the ultra-mobile PC, and/or via the shared space application the next time the invitee opens and communicates to receive.

708 Each invited user can accept the invitation to create the replicated space file locally.

[0075]

712 At 406, the shared space is opened and the persistent whiteboard canvas is presented to the user.  
713 If the user is online, any participant changes made to the canvas are automatically updated and presented to the user.  
715 At 408, the participant may use a number of shared space tools to add expressions, modify expressions, or otherwise interact with the canvas of the shared space.  
717 Each online participant sees other participants' interactions and an updated spatial canvas.  
718 If the user goes offline but comes back online after another participant has made changes, the participant's canvas is then updated to show the changes.  
720 Additionally, each participant can save any object in the space to the local clipboard.  
721 In one embodiment, the scrapbook is space independent, but can be used with any space.  
722 As mentioned above, the shared space application also uses the history or history to track and maintain the space modification process.  
724 Participants can use this history to remember any step at any time.

[0076]

728 As described above, real-time data synchronization (eg, after participant interaction, after going online and opening a shared space, etc.) may be provided by the shared space application and associated components so that all online participants can "see the "The same, persistent storage space in the form of a space canvas.  
731 This synchronization process depends in part on the type of communication network the participants are using to communicate.  
733 For example, a peer-to-peer communication network uses a different synchronization process than that between multiple participant computing devices and a serving computing device.  
735 At 410, the user closes the space, and the connection between the user's computing device and the other participant computing devices is automatically closed.  
737 Thereafter, the graphical user interface (GUI) and other utility resources associated with the spatial canvas are released.

[0077]

742 Referring now to Figures 5A-5K, block diagrams illustrate a user interface for accessing and interacting with a shared space, under one embodiment.  
744 As shown in FIG. 5A, user interface 500 depicts a plurality of shared spaces associated with the current user of the shared spaces application.  
746 User interface 500 is shown after the user successfully completes the authentication process (eg, username, password, and other login credentials).  
748 User interface 500 shows that a user has multiple contacts associated with one or more shared spaces.  
749 As shown, the user has a shared space with contacts including Peter 502, Rose 504, Robin 506, and Mary 508, among others.  
751 User interface 500 also includes boxes for defining new spaces for associated contacts 510 .

752 As described above, each of the contacts 502-508 associated with the shared space may include participant pictures or other identifying indicia that the user may use to personalize the space.

[0078]

757 5B is a block diagram illustrating a user interface 500 of multiple shared spaces.

758 Wires between contacts define multiple shared spaces.

759 For example, Robin 506 and Tom 512 define a shared space with the user.

760 Jacky 514 defines a shared space with this user.

761 Peter 502, Rose 504, Maggie 516, and Frank 518 define another shared space with the user.

762 As described above, users can use the Shared Spaces application to define multiple shared spaces to stay in touch with or otherwise interact with selected participants.

[0079]

767 As shown in Figure 5B, the user has selected Tom 512 ("x" highlights the user selection) to interact in the shared space.

769 The user has not selected Robin 506, so the interaction will only be with Tom 512 until the user invites Robin 506 to join the space or opens a different space.

771 After selecting Tom 512, the user can use button 520 to enter the space.

772 At this point, if Tom is online, a notification to join the associated space is sent to Tom 512.

773 If Tom is offline or has not opened his room app, the notification will be delivered when Tom opens the room and goes online.

[0080]

778 Figure 5C shows the user interface 500 after the user has selected to share the space with Tom 512.

779 Status indicator 522 shows that Tom 512 is "online."

780 As shown in Figure 5C, the spatial canvas 524 is blank.

781 That is, neither Tom 512 nor the user has added anything to the spatial canvas 524.

782 A number of tools 526 for interacting with the spatial canvas 524 are presented to the user.

[0081]

786 5D shows the user interface 500 in a state in which the user can select an object to be included in the shared space with Tom 512 from a plurality of objects (eg, pictures, video, audio, etc.).

788 Objects 528-538 may be selected from local storage, a peer-to-peer source, or some online source.

789 As shown in FIG. 5D, the user has selected object 528 to insert onto spatial canvas 524.

790 That is, the inserted object 528 is an expression provided by the user.

791 Tom 512 sees object 528 on his spatial canvas in real time because it is online.

792 In one embodiment, the user may also use the slideshow button 540 to insert a slideshow onto the spatial canvas 524.

794 Once the user selects one more object, the user can use the insert button 542 to insert one or more objects onto the spatial canvas 524 .

[0082]

799 FIG. 5E shows the user interface 500 after the user has selected the object 528 and inserted the object on the spatial canvas 524 .

801 Once the user has positioned the object 528 on the spatial canvas 524, the user is made available to interact with the inserted object 528 using a number of additional context-sensitive tools 544.

802 Additionally, a user may use handles 546 and 548 to expand/contract and/or rotate object 528 .

804 FIG. 5F shows the user interface 500 after Tom 512 draws an ink drawing 550 on the spatial canvas 524.

805 At each stage in which Tom 512 creates an ink drawing 550, the user is able to see the drawing.

806 5G shows the user interface 500 after Tom 512 has inserted object 552 on the spatial canvas 524.

807 Tom also types some text 554 under the object 552 he inserted.

808 As mentioned above, the user and Tom 512 see the same interaction and information on their respective displays, such as touch screen interactive displays.

[0083]

813 As mentioned above, a shared space application allows a participant to freely interact with a shared space.

814 FIG. 5H shows the user interface 500 after the user has moved the Tom inserted object 552 to a new location on the spatial canvas 524 .

816 The ink 550 is now partially covered by the repositioned object 552 .

817 Figure 5I shows Tom 512 writing in ink a question asking the user why the object 552 was moved (why?

818 ) after the user interface 500.

[0084]

822 FIG. 5J shows user interface 500 in scrapbook view 558 .

823 The user has saved multiple items 560-568 to the clipboard.

824 In one embodiment, the content of the scrapbook is stored locally to the user's computing device.

825 User interface 500 also includes a button 570 that the user can click to go to the history view.

826 FIG. 5K shows user interface 500 in history view 559 .

827 The history includes a number of historical details 572-582 recorded by the shared space application that represent changes and interactions by the participants to the space and the space canvas 524.

829 The user may also use the user interface 500 to mark times in the history for saves other than auto saves.

830 In one embodiment, the history is saved to the serving computing device and available to the user when the user is connected and online.

[0085]

835 As described above, in one embodiment, a shared space application may be included or installed on a

computing device and associated with a service computer for managing aspects of the shared space.

837 For example, a shared space application can be installed on an ultra-mobile personal computer.

838 The portability of ultra-mobile PCs enables users to use shared space applications in an instant, convenient, and easily accessible manner.

840 A shared space application may be configured to provide a shared space to allow multiple users to communicate and interact with each other.

842 A space can always be available to all participants in that space, regardless of whether there is a network connection.

844 That is, once a space is created, the participant is free to interact with the space even when the participant is not currently connected or online.

846 Any changes are updated to other participant spaces as participants connect and/or go online.

[0086]

850 Additionally, the Shared Spaces app enables any space participant to add, modify, create expressions at any time without requiring other participants to join the session.

852 Thus, shared space applications allow a degree of freedom, allowing all participants to express themselves whenever they choose.

854 Likewise, shared space applications allow expressive recipients the freedom to respond whenever they choose.

855 There is no immediate or implied obligation to respond immediately.

[0087]

859 Shared space applications can provide a persistent canvas where all participant expressions are visible on a single display.

861 For example, a display of an ultra-mobile personal computing device may be used to display a shared space, where user expressions may be persistently stored in the display.

863 The user does not have to scroll back and forth to find the desired information because the expressions (including hidden expressions) are contained in the spatial canvas and the viewable area of the display.

865 The shared space is configured to be substantially the same visually to all participants who are online and open the space.

[0088]

870 Additionally, the shared space application is configured to make edits and other modifications to the shared space visible to all participants in real-time or substantially real-time (eg, depending on connection, bandwidth, and other factors).

873 A user can use a pen or finger to draw any handwritten stroke anywhere in space by dragging the pen or finger (called a "swipe") across the space canvas.

875 The user can erase by pressing the modifier button of the stylus or by drawing a scribble stroke (called "metastroking") with the finger.

877 The Shared Spaces application is configured to allow all participants to see the editing process as it occurs.

878 For example, participants can see characters as they are typed (eg, you see corrections), ink as they are drawn  
(and erased), etc.

880 Thus, shared space applications create a sense of presence that is missing in many other applications.

[0089]

884 As described herein, shared space applications provide, but are not limited to, mechanisms for users to stay  
connected using emotionally expressive and/or passive communications.

886 As business relationships, family and friends are spread over greater distances, shared spaces provide a  
convenient and non-intrusive and compulsory means of communication.

888 For example, consider households, where family members live in different parts of the country.

889 The entire family can communicate and engage with each other through the use of shared spaces.

890 Siblings can post photos of important life events or just ordinary everyday events.

891 Other family members can also use the shared space to comment on photos, ask for advice, and/or share  
opinions.

892 Naturally added by each participant as an interactive stream of annotations, drawings, personal notes, videos,  
and/or audio clips, etc.

895 Multiple participants can also occasionally participate in a live connection whenever they view the shared  
space.

[0090]

900 In another example, consider an enterprise composed of multiple enterprise units that depend on each other  
to provide important services to consumers.

902 Enterprise units are located in different parts of the world.

903 Rather than using unreliable email or telephone communications, each employee of the business runs the  
coworking space application on an ultra-mobile personal computing device.

905 Employees can strategically set up and monitor one or more shared spaces among the enterprise's key  
counterparts.

907 For example, a product group can set up a shared space to communicate with a strategic business planner to  
bring new equipment to market.

909 Naturally added by each participant as an interactive stream of annotations, ink, drawings, images, personal  
notes, videos, and/or audio clips, etc.

911 Users can also use the Shared Spaces application to participate in a live audio and/or video session if all parties  
happen to be available at the same time.

[0091]

916 Exemplary Operating Environment

[0092]



920 Referring now to FIG. 6, the following discussion is intended to provide a brief general description of a suitable computing environment in which embodiments of the present invention may be implemented.  
922 Although the invention will be described in the general context of program modules executed in connection with application programs running on an operating system on a personal computer, those skilled in the art will recognize that the invention may also be incorporated into other types of computing systems and programs Module implementation.

[0093]

929 Generally, program modules include routines, programs, objects, components, data structures, and other types of structures that perform particular task roles or implement particular abstract data types.  
931 Moreover, those skilled in the art will appreciate that the methods of the present invention may be implemented using other computer system configurations, including hand-held devices, multiprocessor, microprocessor-based or programmable consumer electronics, minicomputers, mainframe computers, and the like.  
935 The invention can also be practiced in distributed computing environments where tasks are performed by remote processing devices that are linked through a communications network.  
937 In a distributed computing environment, program modules may be located in both local and remote memory storage devices.

[0094]

942 Referring now to FIG. 6, an exemplary operating environment for various embodiments of the present invention will be described.  
944 As shown in FIG. 6, computer 2 includes a general purpose desktop, laptop, handheld computer, or other type of computer capable of executing one or more application programs.  
946 Computer 2 includes at least one central processing unit 8 ("CPU"), system memory 12 including random access memory 18 ("RAM") and read only memory ("ROM") 20, and a system coupling the memory to CPU 8 bus 10.  
948 The basic input/output system contains basic routines that help transfer information between elements in the computer, such as during startup, and is stored in ROM 20.  
951 Computer 2 also includes mass storage device 14 for storing operating system 32, application programs, and other program modules.

[0095]

956 Mass storage device 14 is connected to CPU 8 through a mass storage controller (not shown) connected to bus 10.  
958 Mass storage device 14 and its associated computer-readable media provide non-volatile storage for computer 2.  
960 Although the description of computer-readable media contained herein refers to mass storage devices, such as hard disks or CD-ROM drives, those skilled in the art will understand that computer-readable media may be

accessible or utilized by computing system 2 any available medium.

[0096]

966 By way of example and not limitation, computer-readable media may include computer storage media and communication media.

968 Computer storage media includes volatile and nonvolatile, removable and non-removable media implemented in any method or technology for storage of information such as computer readable instructions, data structures, program modules or other data.

971 Computer storage media include, but are not limited to, RAM, ROM, EPROM, EEPROM, flash memory or other solid state memory technology, CD-ROM, digital versatile disk (DVD) or other optical storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic A storage device, or any other medium that can be used to store the required information and that can be accessed by the computing device 2 .

[0097]

979 According to various embodiments of the present invention, computer 2 may operate in a networked environment using logical connections to remote computers through network 4, such as a local area network, the Internet, or the like.

982 The computer 2 may be connected to the network 4 through a network interface unit 16 connected to the bus 10 .

984 It should be understood that the network interface unit 16 may also be used to connect to other types of networks and remote computer systems.

986 Computer 2 may also include an input/output controller 22 for receiving and processing input from a variety of input types including keyboard, mouse, pen, finger, and/or other means.

988 Similarly, input/output controller 22 may provide output to a display, printer, or other type of output device.

989 Additionally, a touch screen can be used as an input and output mechanism.

[0098]

993 As briefly described above, a number of program modules and data files may be stored within the mass storage device 14 and RAM 18 of the computer 2, including an operating system 32 suitable for controlling the operation of networked personal computers, such as from Redmond, Washington Microsoft's WINDOWS XP operating system.

997 Mass storage device 14 and RAM 18 may also store one or more program modules.

998 In particular, mass storage device 14 and RAM 18 may store applications such as word processing application 28, imaging application 30, email application 34, drawing application, and the like.

[0099]

1003 It should be appreciated that the logical operations of the various embodiments may be implemented (1) as a



series of computer-implemented acts or program modules running on a computer system, and/or (2) as interconnected machine logic circuits or circuits within a computer system module.

1006 The implementation is chosen depending on the performance requirements of the computer system implementing the invention.

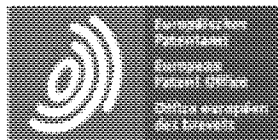
1008 Thus, logical operations including associated algorithms may be variously referred to as operations, structural devices, acts, or modules.

1010 Those skilled in the art will recognize that these operations, structural devices, acts and modules may be implemented in software, firmware, special purpose digital logic, and any combination thereof without departing from the spirit and scope of the invention as set forth in the claims set forth herein .

[0100]

1016 While the invention has been described in conjunction with various exemplary embodiments, those of ordinary skill in the art will appreciate that many modifications are possible within the scope of the appended claims.

1019 Therefore, it is not intended that the scope of the present invention be limited in any way to the above description, but should be determined with full reference to the appended claims.



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## CLAIMS CN101542459A

1.

13 A system for sharing data through the following steps:

14 creating a shared space (500) including a space canvas (524) and a plurality of tools (526);

15 associating one or more users as one or more participants (502-510) of the shared space (500);

16 interacting with the spatial canvas (524) using one of the plurality of tools (526), including using representations such as digital images, digital text, and digital ink (528); and

18 The expression (528) is persisted in the shared space (500).

2.

22 The system of claim 1, wherein data is shared using one of the tools (526) to deliver a video representation onto the spatial canvas (524).

3.

27 The system of claim 1, wherein data is shared by implementing a live connection to deliver audio expressions to one or more communication participants (502-510).

4.

32 The system of claim 1, wherein data is shared by updating the shared space (500) to expose the expression (528) to communication participants (502-510).

5.

37 The system of claim 4, wherein data is shared by updating the shared space (500) to expose the expression

(528) to communication participants (502-510), wherein the expression (528) is synchronized with the shared spatial data of the communication participants (502-510).

6.

43 5. The system of claim 4, wherein the shared space (500) is updated with the representation (528) by sharing data using a master file.

7.

48 The system of claim 1, further comprising a history manager component (220) that stores the expression (528) to a scrapbook (558).

8.

53 The system of claim 1, further comprising a history manager component (220) that maintains a history of the shared space (500).

9.

58 A user interface for sharing data, including:

59 A spatial canvas (524) showing multiple expressions (528-538);

60 A plurality of tools (526) that interact with a shared space (500) that can be shared by a plurality of users, wherein the plurality of tools (526) enable users to include on the space canvas (524), which may be digital ink, digital text, and representations of digital images (528); and

63 An indicator (522) indicating the participant and the participant's current status associated with the shared space (500).

10.

68 The user interface of claim 9, wherein the plurality of tools (526) can be used to create, modify and save one or more representations on the spatial canvas (524).

11.

73 9. The user interface of claim 9, wherein the plurality of tools (526) can include a toolbox tray button, a toolbox button, a tool button, or a palette button.

12.

78 The user interface of claim 9, wherein the spatial canvas (524) can receive input from a stylus, a keyboard, and a finger.

13.

92 9. The user interface of claim 9, wherein the indicator (522) is configured to specify a live connection with another participant (502-510).

14.

93 The user interface of claim 9, wherein the spatial canvas (524) is configured to display one or more expressions made by remote participants (502-510).

15.

93 9. The user interface of claim 9, wherein the user interface includes zooming in and focusing to interact with the expression (528).

16.

98 A method of sharing data with a computing device, comprising:

99 associating a plurality of users with a shared space (500), wherein the shared space (500) includes a canvas (524);

101 interacting with the shared space (500) by adding an expression (528) to the canvas (524), wherein the expression (528) is selectable from digital images, digital text, and digital ink; and

103 The shared space (500) is passed so that each user's canvas (524) includes the added expression (528).

17.

107 17. The method of claim 16, further comprising updating the shared space (500) to display other expressions added by the remote user using the computing device (102).

18.

112 17. The method of claim 16, further comprising storing the added expression (530) to local storage (012).

19.

116 19. The method of claim 18, further comprising communicating the shared space (500) using a peer-to-peer communication service.

20.

121 The method of claim 17, further comprising communicating the shared space (500) to a networked

computing c

[19] 中华人民共和国国家知识产权局



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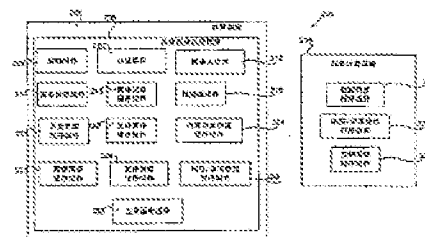
权利要求书2页 说明书23页 附图16页

[54] 发明名称

用于传递信息的共享空间

[57] 摘要

各实施例提供用于传递信息的共享空间。在一实施例中，与计算环境相关联的多个用户可以使用共享空间来彼此传递信息。该计算环境的每一计算设备都可以包括共享空间应用程序。该共享空间应用程序包括可被用来持久存储计算环境的相关联的计算设备之间的各种通信的多个交互式工具。



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## 权 利 要 求 书

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1. 一种通过以下步骤来共享数据的系统：

创建包括空间画布（524）和多个工具（526）的共享空间（500）；

将一个或多个用户作为所述共享空间（500）的一个或多个参与者（502-510）来进行关联；

使用所述多个工具（526）的一个来与所述空间画布（524）交互，包括使用诸如数字图像、数字文本和数字墨水等表达（528）；以及

将所述表达（528）持久存储在所述共享空间（500）中。

2. 如权利要求 1 所述的系统，其特征在于，通过使用所述工具（526）的一个来共享数据，以将视频表达传递到所述空间画布（524）上。

3. 如权利要求 1 所述的系统，其特征在于，通过实现实况连接来共享数据，以将音频表达传递到一个或多个通信参与者（502-510）。

4. 如权利要求 1 所述的系统，其特征在于，通过更新所述共享空间（500）来共享数据，以将所述表达（528）展示给通信参与者（502-510）。

5. 如权利要求 4 所述的系统，其特征在于，通过更新所述共享空间（500）来共享数据以将所述表达（528）展示给通信参与者（502-510），其中所述表达（528）与所述通信参与者（502-510）的共享空间数据同步。

6. 如权利要求 4 所述的系统，其特征在于，通过使用主文件来共享数据，以用所述表达（528）更新所述共享空间（500）。

7. 如权利要求 1 所述的系统，其特征在于，还包括将所述表达（528）存储到剪贴簿（558）的历史管理程序组件（220）。

8. 如权利要求 1 所述的系统，其特征在于，还包括维护所述共享空间（500）的历史的历史管理程序组件（220）。

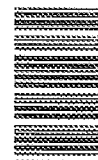
9. 一种共享数据的用户界面，包括：

显示多个表达（528-538）的空间画布（524）；

与可由多个用户共享的共享空间（500）交互的多个工具（526），其中所述多个工具（526）使用户能够在所述空间画布（524）上包括可以是数字墨水、数字文本、和数字图像的表达（528）；以及

指示参与者和与所述共享空间（500）相关联的该参与者的当前状况的

230



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权 利 要 求 书 第2/2页

指示符（522）。

10. 如权利要求 9 所述的用户界面,其特征在于,所述多个工具(526)可被用来在所述空间画布（524）上创建、修改和保存一个或多个表达。

11. 如权利要求 9 所述的用户界面,其特征在于,所述多个工具(526)可以包括工具箱托盘按钮、工具箱按钮、工具按钮或选项板按钮。

12. 如权利要求 9 所述的用户界面,其特征在于,所述空间画布(524)可以接收来自指示笔、键盘和手指的输入。

13. 如权利要求 9 所述的用户界面,其特征在于,所述指示符（522）被配置成指定与另一参与者（502-510）的实况连接。

14. 如权利要求 9 所述的用户界面,其特征在于,所述空间画布(524)被配置成展示远程参与者（502-510）所做出的一个或多个表达。

15. 如权利要求 9 所述的用户界面,其特征在于,所述用户界面包括放大和聚焦以与所述表达（528）交互。

16. 一种用计算设备共享数据的方法,包括:

将多个用户与共享空间（500）进行关联,其中所述共享空间（500）包括画布（524）;

通过向所述画布（524）添加表达（528）来与所述共享空间（500）交互,其中所述表达（528）可以从数字图像、数字文本和数字墨水中选择;以及

传递所述共享空间（500）以使得每一用户的画布（524）都包括所添加的表达（528）。

17. 如权利要求 16 所述的方法,其特征在于,还包括更新所述共享空间（500）来展示远程用户使用计算设备（102）所添加的其它表达。

18. 如权利要求 16 所述的方法,其特征在于,还包括将所添加的表达（530）存储到本地存储（012）。

19. 如权利要求 18 所述的方法,其特征在于,还包括使用对等通信服务来传递所述共享空间（500）。

20. 如权利要求 17 所述的方法,其特征在于,还包括将所述共享空间（500）传递到连网的计算设备（102-106）。





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## 说明书

第1/23页

## 用于传递信息的共享空间

## 背景

人们尝试使用多种通信方法来通信和保持联系，如邮件、电话、数字照片、白板、电子邮件、即时消息传送（IM）应用程序。然而，每一种技术都具有相关联的限制并可能导致用户不满意的体验。例如，即时消息、联网的数字相框、和电子邮件可能是不合时的，并约束可以传递的信息量。像电话和 IM 通信等某些通信方法可能由于迫使一方实时响应而造成侵入。像电子邮件和邮件通信等被动的通信方法允许延迟响应，但通常由于一方可以等待响应而较不具侵入性。然而，被动的方法在情感表达性中可能是非个性的和不足的，因为它们利用采用陈述/回复/陈述/回复通信结构的回合制（例如，电子邮件和即时消息传送）。

其它通信方法缺少逼真度、各种表达性，或限于在临时会话（例如，即时消息传送、虚拟白板）中提供信息。一旦会话结束，则信息丢失。例如，白板通常被用作传递自发的手写观点和概念的媒介。然而，白板上显示的信息对于远程交互和协作而言并不是理想的。部分地由于与视频电话会议设备相关联的限制，远程用户难以阅读和集中在白板的相关部分。例如，写在白板上的墨水笔划可能难以看到，且可能不能由远程用户擦除或编辑。因此，实时多用户物理白板协作是受限的，并且对远程参与者而言通常是不令人满意的体验。

## 概述

提供本概述以便以简化的形式介绍将在以下详细描述中进一步描述的一些概念。该概述不旨在标识所要求保护的主题的关键特征或本质特征，也不旨在用于帮助确定所要求保护的主题的范围。

各实施例提供用于传递信息的“共享空间”。该共享空间可被配置成允许多个用户通过使用该共享空间来通信。在一实施例中，共享空间应用程序被配置成提供可由两个或更多个用户共享来交互的持久空间。用户可

023



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以具有多个分开的空间来与其它个人和/或群体进行共享和通信。在各实施例中，可以使用用于共享和传递各种信息的简单通信工具的灵活聚集来填充共享空间并与其交互。该通信工具和共享空间向用户提供自然且方便地交互和通信的持久手段。

通过阅读以下详细描述和审阅相关联附图，这些和其他特征和优点将是显而易见的。可以理解，前述一般描述和以下详细描述均仅是说明性，且不限所要求保护的本发明。

#### 附图简述

图 1 是计算环境的框图。

图 2 是计算环境的框图。

图 3 是共享空间体系结构的框图。

图 4 是示出使用共享空间的流程图。

图 5A-5K 示出用于与共享空间交互的用户界面。

图 6 是示出用于实现本文中所述的各个实施例的计算环境的框图。

#### 详细描述

各实施例提供共享空间，其中多个用户可以使用该共享空间来传递信息。该共享空间可被配置成允许多个用户通过使用该共享空间来通信。在一实施例中，共享空间应用程序被配置成提供可由两个或更多个用户共享和使用以便使用各种工具来通信的持久空间。计算设备的显示器可被用来向使用该共享空间应用程序的用户呈现共享空间以共享这一空间。用户可以使用该共享空间应用程序所提供的各种工具来与该共享空间实时地或在其方便时进行交互。

在一实施例中，多个共享空间可被呈现在一个或多个显示器上，从而允许用户同时与各个个人和/或群体进行交互。即，用户可以拥有分开的空间来与不同的个人和/或群体保持联系和通信。在各实施例中，共享空间可以使用允许共享各种信息的简单通信工具的灵活聚集来填充。例如，用户可以使用通信工具来用图像、文本、音频、手绘图和手写文字（例如，数



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字墨水)和/或其它数据来填充共享空间。这些通信工具被配置成提供自然和方便的通信和交互。

在一实施例中,共享空间是持久的且总是对相关联的参与者保持可用,即使是在参与者未在使用该空间和/或未登录(例如离线)时。用户可以邀请一个或多个参与者共享一个或多个空间。共享空间的参与者可向其添加、从中删除和/或以其它方式来修改该空间。其后,该共享空间的所有参与者看到或将看到该交互的同一结果。共享空间应用程序被配置成允许参与者将内容保存到私有剪贴簿,因为共享空间的特性可以是高度瞬时的。此外,共享空间应用程序被配置成使用共享的和专有的数据,但并不受限于此。在一实施例中,共享空间应用程序还被配置成启用“实况连接”。该实况连接使多个参与者能够使用该共享空间应用程序来参加实况音频和/或视频通信。

图1是一实施例下的计算环境100的框图。计算环境100可以被描述为各组件的网络,其中相关联的组件以提供操作功能的方式通信地耦合。多个计算设备102-106彼此通信,以提供计算设备的网络。多个计算设备102-106还可以与服务计算设备107通信。每一计算设备102-107都包括被配置成在计算设备102-107之间提供通信功能的连网和安全组件。计算设备102-106可以包括台式计算机、膝上型计算机、图形输入板计算机、手持式设备和其它通信设备。

如图1所示,每一计算设备102-106包括共享空间应用程序108-112,以下详细描述。服务计算设备107包括空间管理程序组件114,但并不限于此。空间管理程序组件114可被配置并用于管理一个或多个共享空间的各方面,但并不受限于此。例如,空间管理程序组件114可以维护与共享空间相关联的读写主数据文件。在一实施例中,每一共享空间108-112和空间管理程序组件114都包括结合计算设备102-107的处理器执行的软件应用程序。如下所述,每一共享空间应用程序108-112被配置成向与该共享空间相关联的多个用户提供持久空间。为简化以下讨论,在描述共享空间应用程序的功能和使用时,引用计算设备102和相关联的共享空间应用程序108。



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如下所述，用户可以使用计算设备 102 和相关联的共享空间 108 来与共享空间的其他用户进行通信和交互。共享空间可以被描述为可由一个或多个用户以各种方式用来通信的持久画布或交互式窗口。即，共享空间应用程序 108 被配置成持久存储关于相关联的共享空间的用户交互，包括各种表达。相应地，不管其物理位置，与该共享空间相关联的所有用户都看到该用户交互。在各实施例中，在共享空间中所创建的、放置的、或以其它方式定位的任何内容（墨水、视频文件、音频文件、文本、图片等）都被持久存储在该共享空间中，直到被删除或以其它方式被修改为止。

用户可以使用共享空间应用程序 108 来与多个分开的空间和/或用户进行交互。例如，用户可以使用共享空间应用程序 108 来创建使用该用户能够与各个个人和/或群体保持联系的多个共享空间。用户与共享空间的交互被称为表达。共享空间应用程序 108 被配置成将表达持久存储在该共享空间中，直到该表达被与该共享空间相关联的用户删除或以其它方式修改为止。例如，如果用户在共享空间中绘制了图片或张贴了照片，则该项目保持在该共享空间中，即使其被其它项目覆盖。

共享空间应用程序 108 可被安装在计算设备 102 上。例如，共享空间应用程序 108 可作为操作系统（OS）安装过程的一部分来安装。如上所述，用户可以使用共享空间应用程序 108 来与共享空间的一个或多个用户或参与者进行通信。另外，共享空间的传递可被提供给多个相关联的计算设备。共享空间向多个计算设备的通信使得协作和交互即使对远程位置的用户而言也成为快乐的体验。因此，共享空间应用程序 108 向企业、家庭、朋友以及其它各方提供用于通信交互的方便的媒介。

例如，共享空间的传递可被提供给通过诸如因特网等网络通信的多个超移动计算设备和相关联的用户。在一实施例中，共享空间的传递是使用在线文件存储服务来通过因特网提供的。在另一实施例中，共享空间的传递是使用诸如例如点对点同步服务等点对点服务来向多个计算设备提供的。

共享空间的传递可被提供给计算网络的计算设备 102-107，计算网络诸如无线局域网（WLAN）、局域网（LAN）、广域网（WAN）、其组合、



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和/或某种其它类型的计算和/或通信网络。在一实施例中，计算环境 100 是允许一个或多个计算设备、通信设备、数据库等根据所需实现来通信的分布式计算机网络。

计算环境 100 的各组件可以使用有线、无线、有线和无线的组合、以及其它通信技术来彼此通信地耦合。共享空间的传递还可以包括各种通信方法的组合。传递共享空间的其它实施例包括文件/文件夹共享方法和/或同步方案。例如，诸如 FOLDERSHARE（文件夹共享）等文件/文件夹共享程序可被用来传递共享空间和相关联的所显示的内容。

在一实施例中，共享空间应用程序 108 被配置成操作、持久存储和/或显示主文件的内容，诸如例如主文件的只读副本。在共享空间被修改或以其它方式改变时主文件可被更新。即，共享空间应用程序使用主文件来跟踪和维护对共享空间的改变。在一实施例中，主文件与每一共享空间相关联。每一计算设备 102-106 都可以使用主文件来显示共享空间的内容，包括最近对共享空间的改变和修改。

在一实施例中，每一计算设备 102-106 与对等网络相关联并使用与共享空间相关联的主文件。在与共享空间相关联的计算设备 102-106 连接并在线时，主数据文件将状态从只读状态改变为读写状态。此后，在对相关联的共享空间进行添加、删除、和其它改变时，本地主数据文件实时地同步。在计算设备断开连接（例如，用户离线）时，本地主数据文件被重新配置成只读。此后，在下一次用户登录共享空间并且共享空间应用程序 108 连接到读写主文件时，该读写主文件被复制覆盖（例如替换）本地只读主文件，以便在用户断开连接的同时用所发生的所有添加和改变来更新该主文件。

因此，由于发生对共享空间的更新，所以每一主文件被更新和/或与该共享空间的其它相关联的主文件同步。因此，共享空间应用程序 108 用于确保当前彼此通信（例如，连接的或登录的）的用户看到同一信息。共享空间应用程序 108 被配置成修改主文件，且共享空间的传递在用户与另一参与者和相关联的主文件通信时通过使用该主文件来提供。例如，共享空间的传递可以在用户具有通过在线存储服务到相关联的主文件的和/或直接





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到另一相关联的计算设备（例如对等）的连接时提供。

如上所述，共享空间应用程序 108 可被配置成维护相关联的计算设备的本地存储中的最后版本主文件的只读副本。如果用户离线，则共享空间应用程序 108 不提供对只读主文件的访问。然而，用户可以查看该主文件的只读副本，但不能对该主文件进行改变。如下所述，用户还可以将存储在该只读主文件中的一个或多个表达保存到剪贴簿中。如果在一用户离线时另一用户改变了与共享空间相关联的主文件，则该离线用户将看不到这些改变，直到他们登录回相关联的共享空间为止。因此，用户必须登录到共享空间以便共享空间应用程序 108 可以访问并使用该读写主文件来用该用户离线以来的任何改变更新共享空间。

作为示例，假定用户 A 和用户 B 拥有一共享空间。用户 A 在线。在用户 A 打开该共享空间时，共享空间应用程序访问主文件。作为一个示例，共享空间应用程序可以从虚拟硬盘驱动器来访问主文件。随后，用户 A 向该共享空间添加图片。共享空间应用程序向主文件 and 用户 A 的本地只读文件添加图片。用户 B 是离线的，且打开该共享空间，其示出用户 B 是离线的。用户 B 不能看到用户 A 刚刚添加的图片。此后，用户 B 上线，如连接到因特网。一旦用户 B 上线，则共享空间应用程序访问并读取主文件，并更新用户 B 的机器上的本地只读文件。现在用户 B 看到用户 A 添加到共享空间的图片。

在一实施例中，读写主文件是在服务计算设备 107 上存储并维护的。因此，与共享空间相关联的用户需要具有网络连接并在线以对该共享空间和相关联的读写主文件进行改变。在其它实施例中，主文件可以使用 web 服务来在对等机器和/或用户的计算设备上存储和维护。随后当与共享空间相关的所有参与者在通信时，主文件可以复制到全部的参与者。在一替换实施例中，用户可以在任何时候对其本地文件进行添加和/或改变。此后，在每一参与者重新连接到共享空间（例如登录）或连接到另一参与者（例如对等）时，进行同步以聚集每一参与者所进行的所有离线改变，以使得每一参与者“看到”同一空间。

图 2 是一实施例下的计算环境 200 的框图。计算环境 200 包括与服务

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计算设备 204 通信的计算设备 202。计算环境 200 的各组件可以使用有线、无线、有线和无线的组合、以及其它通信和连网技术来彼此通信地耦合。尽管示出了一个计算设备 202 和一个计算设备 204, 但其它实施例可以包括多个这种计算和服务计算设备。在一实施例中, 共享空间可以在使用诸如超移动计算设备等两个计算设备的至少两个用户之间创建和定义。

如图 2 所示, 计算设备 202 包括共享空间应用程序 206。共享空间应用程序 206 被配置成可以由多个用户共享来交互的持久空间。根据该实施例, 共享空间应用程序 206 包括用于维护空间的多个相关联的组件。共享空间应用程序 206 包括但不限于: 启动组件 208; 认证组件 210; 联系人组件 212; 画布分派组件 214; 媒体记录程序组件 216; 帧捕捉组件 218; 历史/剪贴簿管理程序组件 220; 空间管理程序组件 222; 内容对象创建程序组件 224; 数据同步程序组件 226; 文件创建程序组件 228; 响应/请求处理程序组件 230; 以及空间画布组件 232。在各替换实施例中, 各组件的功能和操作可被组合来提供更少的组件和/或所需实现。

启动组件 208 可被配置为用户界面并用于提供用户认证、空间选择和/或参与者选择, 认证组件 210 可被配置并用作认证服务, 如 PASSPORT 服务。联系人组件 212 可被配置并用于定位和/或维护用户联系人列表。例如, 联系人组件 212 可被配置成连接到 MSN 服务来展示作为共享空间的参与者的、用户的 MSN 联系人列表。画布分派组件 214 可被配置并用于创建新空间画布并显示空间中的对象。媒体记录程序组件 216 可被配置并用于记录音频、图像、视频和其它对象/表达。例如, 媒体记录程序组件 216 可以使用本地照相机、话筒、和/或其它组件来将图像、音频和视频作为空间中的表达来记录。

继续参考图 2, 帧捕捉组件 218 可被配置并用于捕捉空间的用于历史和/或剪贴簿的“快照”图像。历史/剪贴簿管理程序组件 220 可被配置并用于管理空间的“快照”的按时间顺序的集合, 并向用户提供审阅所选表达和/或将其存储在被称为剪贴簿的私有本地储存库中的机制。历史/剪贴簿管理程序组件 220 可以记录空间中发生的每一事件。因此, 用户不必不断地使用保存操作, 这允许与该空间的更非正式交互。空间管理程序组件 222



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可被配置并用于管理空间的各方面。例如，空间管理程序组件 222 可被配置并用于管理主文件的本地副本。内容对象创建程序组件 224 可被配置并用于管理空间中的对象和其它表达。例如，内容对象创建程序组件 224 可被配置并用于管理图像、墨水、文本、和/或其它用户表达。

数据同步程序组件 226 可被配置并用于在用户计算设备 202 和服务计算设备 204 之间同步数据文件。例如，数据同步程序组件 226 可被配置并用于在用户计算设备 202 和服务计算设备之间同步主数据文件。文件创建程序组件 228 可被配置并用于管理共享空间数据文件，包括但不限于：创建、打开、和保存共享空间数据文件。响应/请求处理程序组件 230 可被配置并用于管理计算设备之间的通信。例如，响应/请求处理程序组件 230 可被配置并用于管理计算设备 202 和服务计算设备 204 之间的通信。空间画布组件 232 可被配置并用作启用用户与空间的交互的用户界面。

根据该实施例，服务计算设备 204 包括多个共享空间组件。如图 2 所示，服务计算设备 204 包括但不限于：数据同步程序组件 234；响应/请求处理程序组件 236；以及空间管理程序组件 238。数据同步程序组件 234 可被配置并用于在服务计算设备 202 与一个或多个用户计算设备之间同步数据文件。例如，数据同步程序组件 234 可被配置并用于在服务计算设备 204 和用户计算设备 202 之间同步主数据文件。响应/请求处理程序组件 236 可被配置并用于管理服务计算设备与一个或多个其它计算设备之间的（包括与其它服务计算设备之间的）通信。空间管理程序组件 238 可被配置并用于管理空间的各方面。例如，空间管理程序组件 238 可被配置并用于管理主文件的读写主副本。其它实施例也是可以获得的。

共享空间应用程序 206 被配置成使用并提供共享空间中的各种对象。在一实施例中，共享空间应用程序 206 使用并提供：表示正共享一空间的其他用户的参与者指示符（例如，图标、数字图像等）；该空间中的表达（例如，墨水、文本、照片、视频、实况连接等）；以及多个交互式工具。例如，图标（例如，默认人或群体图标）或数字图像可被用于表示正共享一空间的个人或群体。数字图像或照片可以使用联系人组件 212 连同与个人相关联的名称或群体名称一起导入或丢弃。联系人组件 212 可被配置成





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向共享空间应用程序 206 传播名称/照片更新/改变。个人参与者指示符可以包括参与者状况或状态（例如，在场、忙碌、不在场等）的指示。群体参与者指示符还可以包括处于每一状态的参与者的计数（12 人中 4 人在场等）。如下所述，在用户敲击一参与者指示符时，建立实况连接（例如，音频和/或视频——取决于可用设备硬件和服务特征）。

表达包括参与者在空间中创建的任何项目，包括墨水、图像、文本、视频、实况连接等。例如，参与者可以使用图形输入板笔来绘制图片或书写一些文本。例如，用户还可以使用手指和触摸屏来在空间中书写墨水。在一实施例中，表达可以包括 3 种状态：正常、聚焦、和放大，但不限于此。在正常表达状态中，新表达出现在旧表达的顶部（除总是出现在顶部的实况连接之外）。先前保持的实况连接可以由诸如实况连接图标等实况连接指示符来表示。文本表达可以通过在文本区域中触摸并上下拖曳来滚动。对共享空间中的表达（或表达组）进行聚焦用于在该项目周围显示选取框。

以下表 1 列出多个表达以及每一表达是如何接收聚焦的。

表 1

表达	在从……中敲击时获取聚焦
墨水	选择工具
图像	选择工具
视频	选择工具
音频（音乐）	选择工具
文本	选择工具 文本工具
实况连接图标	选择工具
表达组	选择工具

在聚焦状态中，单独的表达（单独选择）或表达组（组选择）可以具有聚焦。在表达（或表达组）具有聚焦时，其被临时地显示在其它表达的顶部，包括周围的选取框、放大按钮、和移动手柄。失去聚焦将该表达（或

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组)以查看顺序返回其先前位置。用户可以拖曳选取框以移动表达(例如,从中心或移动手柄拖曳)、调整表达的大小(例如从边缘和角落拖曳)、以及旋转表达(例如拖曳移动手柄或旋转柄)。

在一实施例中,对表达的任何改变(例如,移动、调整大小、旋转)用于将经改变的表达移动到查看顺序的顶部。改变对表达的聚焦而不对该表达进行任何改变用于以查看顺序将该表达返回到其先前位置。用户可以通过敲击共享空间的空白区域或选择另一表达来清除聚焦。粘贴到共享空间的表达被自动地给予聚焦。

用户可以敲击用于将表达视图改变为放大状态的放大按钮。在放大状态中,表达被放大来包围显示器的实质部分(工具保持可见)。在放大状态中,表达不能被移动、调整大小或旋转。用户可以敲击用于将表达返回聚焦状态的关闭按钮。

以下表2列出与各表达相关联的多个上下文控件和信息。

表 2

表达	控件	信息(元数据)
墨水	关闭 将副本保存在剪贴簿中 删除	时间戳 作者(只限>2参与者)
图像	关闭 将副本保存在剪贴簿中 删除 裁剪(工具)	时间戳 作者(只限>2参与者) 大小 位置(如果记录了的话)
视频	关闭 将副本保存在剪贴簿中 删除 裁剪	时间戳 作者(只限>2参与者) 大小 位置(如果记录了的话)
音频(音乐)	关闭 将副本保存在剪贴簿中 删除	时间戳 作者(只限>2参与者) 大小

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	裁剪	
文本	关闭 将副本保存在剪贴簿中 删除	时间戳（表达中的子陈述） 作者（表达中的子陈述）
实况连接	关闭 将副本保存在剪贴簿中 删除 播放 停止 暂停 倒带 快进	参与者 时间戳 大小 持续时间 记录中的当前位置
表达组	关闭 将副本保存在剪贴簿中 删除	聚集大小



共享空间应用程序的工具被配置成方便照片、视频、音频、墨水、文本和其它用户表达的共享。这些工具可被用来创建、选择、修改并保存表达。在一实施例中，这些工具是经由空间画布组件 232 来提供的，并被配置为多个按钮（例如，触摸屏按钮、图形输入板按钮、图标等）。按钮类型包括但不限于：工具箱托盘按钮：展开/折叠工具箱托盘；选择工具并随后折叠工具箱托盘的工具箱按钮；激活控件（对模态按钮）或展开/折叠选项板（对选项板）的工具按钮；以及从选项板中选择项目/模式/选择并关闭该选项板的选项板按钮。工具按钮的外观可被改变以反映当前选项板选择。

以下表 3 示出一实施例下的每一工具箱、工具和选项板。

表 3

工具箱	工具	选项板
墨水	笔（默认）	
	放大笔	

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	墨水浓度	浓度选项板
	墨水颜色	颜色选项板
	笔划擦除器	
从……获取材料	我的图片（默认）	
	我的视频	
	我的音乐	
	剪贴簿	
	历史	
文本	文本（默认）	
	样式	样式选项板
	大小	大小选项板
	颜色	颜色选项板
	字体	字体选项板
选择	单独选择（默认）	
	组选择（有界的表达）	
	复制	
	粘贴	
	撤消	
剪贴簿		



共享空间应用程序 206 和相关联的工具允许参与者与空间交互，并在该空间中任何所需位置处定位表达。此外，空间参与者在其方便时自由地与空间交互。没有刚性的通信要求或协议（例如，用户 1 通信之后是用户 2 通信再之后是用户 3 通信等）。

如上所述，共享空间应用程序 206 被配置成在共享空间的各参与者之间提供实况连接。在一实施例中，实况连接被配置成相当于具有少许例外的表达。实况连接可被用来参与（并存储）实况音频/视频会话（例如像视频会议），或记录对于另一参与者的消息（例如像音频邮件或视频邮件）。在任一情况下，方法和控件都是相同的。在通过敲击参与者图标打开实况

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连接时，用户被提示选择一种类型的实况连接。实况连接的类型取决于服务订阅的类型。

以下表 4 列出一实施例的实况连接的订阅类型。

表 4

订阅类型	与一参与者的实况连接	与群体或多个参与者的实况连接
基本	音频 视频	记录音频并在共享空间中留下消息。 记录视频并在共享空间中留下消息。
高级	音频 视频	组合的音频。 为每一参与者分离视频流。

实况连接被配置成提供本地（“我”）和远程（“你”）视图。在群体实况连接中，该群体的每一成员都有“你”视图。在打开实况连接的同时，提供了多个控件和信息。提供持续时间信息以显示实况连接的持续时间（例如分钟:秒）。（向音频和视频两者）提供用于将设备话筒和照相机静音以使得其他人不能听到或看到你的静音按钮。关闭按钮在被敲击时用于提示用户选择“取消”、“保持”或“擦除”。选择取消返回到实况连接，好像关闭按钮未被敲击过一样。选择保持将实况连接置于相关联的空间，并由一实况连接图标来表示。选择擦除丢弃所缓存的实况连接。

共享空间应用程序 206 还被配置成使用历史/剪贴簿管理程序组件 220 提供剪贴簿。剪贴簿提供对表达和空间快照的方便的私有存储。剪贴簿可以通过敲击剪贴簿工具来打开。剪贴簿被配置成提供多个视图（例如，列表、图标、缩略图等）和分组/分类（例如，按参与者，按日期、按表达类型、按位置等）。剪贴簿还包括用于定位该剪贴簿中的表达和其它项目的搜索/过滤工具。

任何表达或空间快照都可以存储在剪贴簿中。剪贴簿包括用于将当前

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空间的快照副本以图像的形式保存在剪贴簿中的“保存空间”按钮。剪贴簿的内容存储在操作文件系统中的名为“我的剪贴簿”的文件夹中。“我的剪贴簿”是“我的图片”、“我的记事簿”和“我的音乐”的对等体。在安装共享空间应用程序时，可以创建“我的剪贴簿”文件夹。剪贴簿中的表达同样具有 3 种状态（正常、聚焦、放大）和同样所有的相应控件以及它们在空间中进行的行为，除以下控件被改变和添加之外：移动、调整大小、旋转不可用；“将副本保存到剪贴簿”被“复制到空间”所替换；“打印”按钮打印表达或空间快照。

“获取材料”工具箱被配置成提供浏览项目和从操作文件系统中将项目导入空间的方便的方式。“获取材料”工具箱可被用来从诸如我的图片、我的视频和我的音乐等各个文件夹中浏览和导入项目。从“获取材料”工具箱中敲击“我的<材料>”工具打开浏览操作文件系统中的相应<材料>文件夹的内容的查看程序。提供了多个视图（例如，列表、图标、缩略图等）和分组/分类（例如，按参与者，按日期、按表达类型、按位置等）。还提供了搜索/过滤工具。表达同样具有 3 种状态（正常、聚焦、放大），和同样所有的相应控件和它们在空间中进行的行为，除以下控件被改变和添加之外：移动、调整大小、旋转不可用；“将副本保存到剪贴簿”被“复制到空间”所替换。

共享空间应用程序 206 还被配置成使用历史/剪贴簿管理程序组件 220 提供历史。在一实施例中，历史是在服务计算设备 204 中维护并从中访问的。历史可被配置为空间的简单的只读临时视图。在一实施例中，空间历史可以全屏显示，具有以下控件：单独选择（默认）；组选择（有边界的表达）；以及复制。在另一实施例中，历史可以作为列表、缩略图等来显示。历史视图包括可被用来控制时间（例如占据工具托盘空间）的水平滚动条。历史中的表达同样具有 3 种状态（正常、聚焦、放大），和同样所有所显示的相应信息，但不具有任何修改控件。另外，“将副本保存到剪贴簿”被“复制到空间”所替换。

在一实施例中，共享空间应用程序 206 可被配置成提供 3 个用于访问自动存储的笔划、片段和其它表达的界面。第一个是无限撤消和重做。使

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用撤消和重做，用户可以访问片段的任何过去的状态。第二个是时间滑动条。使用时间滑动条，用户可以直接指定时间点，或使用跳转按钮到达离散的“感兴趣的”时间点。第三个是基于上下文的搜索，这可以被实现为行为。搜索行为允许用户基于诸如时间、片段、位置、片段大小、墨水颜色等上下文信息来检索先前的笔划、片段和其它表达。搜索结果在屏幕上被示为一组缩略图，且用户可以通过点击缩略图来访问历史中的点。

图3是一实施例下的共享空间体系结构300的框图。共享空间体系结构300可被配置为包括核心层302的分层体系结构。核心层包括服务和配置组件302a、事件处理组件302b和显示上下文组件302c。

模型层304定义文档、用户界面、工具和交互样式的基本接口。模型层304包括空间模型组件304a、用户界面模型304b、工具模型304c、交互组件304d和物理组件304e。模型层304包括定义共享空间组件的抽象的接口和抽象类。模型层304可以与通用层306分开以确保模块和组件的可扩展性、灵活性、可重用性和互操作性。

空间模型组件304a定义可以作为空间的一部分的基类和对象功能。用户界面模型304b定义适于室件(roomware)组件的替换用户界面概念。工具模型304c向空间提供附加功能。突出的示例是工具条或浏览器。空间浏览器具有在用户界面和空间之间提供连接的角色。另外，工具模型304c控制可能的工作模式，例如耦合的程度。物理模型是与共享空间相关的“真实”世界的各部分的表示。例如，术语“站”指的是运行共享空间应用程序的计算机。交互组件304d支持不同样式的交互，包括定义不同的交互样式。

通用层306可以提供用于交互和通信的功能，如团队协作、会议和其它情况。通用层306包括链接和引用组件306a、显示区域组件306b、工具条组件306c、点击组件306d、拖放组件306e、空间组件306f、交互组件306g、浏览器组件306h、姿势组件306i和站组件306h。通用层306包括像文本、图形和非正式的手写输入等标准数据类型，以及用于例如通用协作支持的私有和公共工作空间。

超媒体数据模型类的实例作为共享对象空间的一部分被包括。因此，



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用户可以同时访问这些对象。通用文档元素包括工作空间（页面的等效物）、手写输入（涂鸦）、文本和图像。用户界面的主元素包括片段和覆盖物。交互可被分为“片段”，其定义了对诸如文档浏览器等工具可用的空间。另外，“覆盖物”可被自由放置。文档浏览器和工具条由通用层 306 提供。

对于与各组件的交互，存在除使用鼠标和键盘外的可用的交互技术。这些技术包括用笔或手指来书写的姿势、以及对拖放的支持。为生成上述姿势事件，绘制的每一笔划都可被发送到姿势识别程序。共享空间体系结构 300 还包括具有同步组件 308a、复制组件 308b、认证组件 308c 和安全组件 308d 的基础层 308。

图 4 是示出一实施例下的用于使用共享空间应用程序的过程的流程图。如上所述，共享空间可以在两个或更多用户之间共享。在用户在线且相应的计算设备彼此通信时，共享空间可以根据任何参与者改变来更新。如上所述，一旦用户成为共享空间的参与者，则该用户可以用各种方式与共享空间的另外的一个或多个参与者交互和通信。

在 400 处，在用户的计算设备上安装共享空间应用程序。在 402 处，提示用户在使用共享空间应用程序之前注册。收集与该用户相关联的简档信息并可将其存储在服务器计算设备上或作为注册过程的一部分来本地地存储。在 404 处，在注册之后，已注册的用户可以创建或加入空间来与其他已注册的用户共享。每一空间都可以具有标识该空间的唯一名称。在创建空间之后，空间发起者可以邀请多个其他用户加入所创建的空间。该用户可以使用联系人储存库（例如，消息通信程序联系人（“伙伴”）、OUTLOOK 联系人、WINDOWS VISTA 联系人等、或联系人的聚集）来标识要共享所创建的空间的可能用户。一旦该用户邀请了另一用户加入空间，则共享空间应用程序被配置成向被邀请者发送邀请消息。被邀请者可以经由电子邮件、IN、SMS、超移动 PC 上的外壳应用程序来接收该邀请消息，和/或在被邀请者下一次打开共享空间应用程序并通信时，经由该共享空间应用程序来接收。每一被邀请的用户可以接受该邀请来在本地创建复制的空间文件。

在 406 处，打开共享空间并向用户呈现持久的白板画布。如果用户在





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线，则对该画布进行的任何参与者改变都被自动地更新并呈现给该用户。在 408 处，参与者可以使用多个共享空间工具来添加表达、修改表达、或以其它方式与该共享空间的画布交互。每一在线参与者都看到其它参与者的交互和经更新的空间画布。如果用户离线但在另一参与者进行了改变之后回到在线，则该参与者的画布随后被更新来显示改变。另外，每一参与者都可以将空间中的任何对象保存到本地剪贴簿中。在一实施例中，剪贴簿是空间独立的，但可以与任何空间一起使用。如上所述，共享空间应用程序还使用历史纪录或历史来跟踪和维护空间修改过程。参与者可以使用该历史纪录来记起任何时候的任何步骤。

如上所述，实时数据同步（例如，在参与者的交互之后、在上线并打开共享空间之后等）可由共享空间应用程序和相关联的组件来提供，以使得所有在线参与者都能够“看到”相同的、空间画布形式的、持久存储的空间。该同步过程部分地取决于参与者正用来通信的通信网络的类型。例如，对等通信网络使用与多个参与者计算设备和服务计算设备之间的同步过程相比所不同的同步过程。在 410 处，用户关闭空间，并且用户的计算设备和其它参与者计算设备之间的连接被自动地关闭。此后，释放与空间画布相关联的图形用户界面（GUI）和其它实用程序资源。

现在参考图 5A-5K，各框图示出一实施例下的用于访问共享空间并与其交互的用户界面。如图 5A 所示，用户界面 500 描绘与共享空间应用程序的当前用户相关联的多个共享空间。用户界面 500 是在用户成功地完成认证过程（例如，用户名、口令、以及其它登录凭证）之后示出的。用户界面 500 示出用户具有与一个或多个共享空间相关联的多个联系人。如图所示，用户拥有具有包括 Peter 502、Rose 504、Robin 506 和 Mary 508 等的联系人的共享空间。用户界面 500 还包括用于定义关于相关联的联系人 510 的新空间的框。如上所述，与共享空间相关联的每一联系人 502-508 都可以包括用户可以用来个性化空间的参与者图片或其它标识标记。

图 5B 是示出多个共享空间的用户界面 500 的框图。各联系人之间的连线定义多个共享空间。例如，Robin 506 和 Tom 512 定义与该用户的共享空间。Jacky 514 定义与该用户的共享空间。Peter 502、Rose 504、Maggie 516

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和 Frank 518 定义与该用户的另一共享空间。如上所述，用户可以使用共享空间应用程序来定义多个共享空间以与选择的参与者保持联系或以其它方式交互。

如图 5B 所示，用户选择了 Tom 512 (“x” 加亮了用户选择) 来在共享空间中交互。用户未选择 Robin 506，所以该交互将只是与 Tom 512 的，直到用户邀请 Robin 506 加入该空间或打开不同的空间为止。在选择 Tom 512 之后，用户可以使用按钮 520 来进入空间。在该点处，如果 Tom 在线，则向 Tom 512 发送加入相关联的空间的通知。如果 Tom 离线或未打开其共享空间应用程序，则将在 Tom 打开该共享空间应用程序并上线时传递该通知。

图 5C 示出用户选择了与 Tom 512 共享该空间之后的用户界面 500。状况指示符 522 示出 Tom 512 “在线”。如图 5C 所示，空间画布 524 是空白的。即，Tom 512 和用户都没有向空间画布 524 添加任何东西。向用户呈现了用于与空间画布 524 交互的多个工具 526。

图 5D 示出处于一状态中的用户界面 500，其中用户可以从多个对象(例如，图片、视频、音频等)中选择要包括在与 Tom 512 的共享空间中的对象。对象 528-538 可以从本地存储、对等源或某一在线源中选择。如图 5D 所示，用户选择了对象 528 来插入到空间画布 524 上。即，所插入的对象 528 是用户所提供的表达。Tom 512 实时地看到其空间画布上的对象 528，因为其在在线。在一实施例中，用户还可以使用幻灯片放映按钮 540 来将幻灯片放映插入到空间画布 524 上。一旦用户选择了再多一个对象，则用户可以使用插入按钮 542 来将一个或多个对象插入到空间画布 524 上。

图 5E 示出用户选择了对象 528 并在空间画布 524 上插入了对象之后的用户界面 500。一旦用户在空间画布 524 上定位了对象 528，则使用该用户可以使用多个附加上下文相关的工具 544 来与所插入的对象 528 交互。另外，用户可以使用把手 546 和 548 来扩展/收缩和/或旋转对象 528。图 5F 示出 Tom 512 在空间画布 524 上绘制墨水图画 550 之后的用户界面 500。在 Tom 512 创建墨水图画 550 的每一阶段，该用户都能够看到该图画。图 5G 示出 Tom 512 在空间画布 524 上插入对象 552 之后的用户界面 500。Tom 还在他

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插入的对象 552 下键入了一些文本 554。如上所述, 用户和 Tom 512 在各自的、诸如触摸屏交互式显示器等显示器上看到同一交互和信息。

如上所述, 共享空间应用程序允许某一参与者自由地与共享空间交互。图 5H 示出用户将 Tom 插入的对象 552 移动到空间画布 524 上的新位置之后的用户界面 500。墨水 550 现在部分地被重新定位的对象 552 所覆盖。图 5I 示出 Tom 512 用墨水书写了询问该用户为何移动对象 552 的问题(why?) 之后的用户界面 500。

图 5J 示出剪贴簿视图 558 中的用户界面 500。用户将多个项目 560-568 保存到了剪贴簿。在一实施例中, 剪贴簿的内容本地地存储到用户的计算设备中。用户界面 500 还包括用户可以点击来前往历史视图的按钮 570。图 5K 示出历史视图 559 中的用户界面 500。历史包括共享空间应用程序所记录的、表示参与者对空间和空间画布 524 的改变和交互的多个历史细节 572-582。用户还可以使用用户界面 500 来标记历史中除自动保存之外的用于保存的时间。在一实施例中, 历史被保存到服务计算设备并在用户连接并在线时对用户可用。

如上所述, 在一实施例中, 共享空间应用程序可以包括或安装在计算设备上, 并与用于管理共享空间的各方面的服务计算机相关联。例如, 共享空间应用程序可以安装在超移动个人计算机上。超移动 PC 的便携性使用户能够以即时、方便、和容易访问的方式来使用共享空间应用程序。共享空间应用程序可被配置成提供共享空间以允许多个用户彼此通信和交互。空间可以总是对该空间的所有参与者可用, 而不管是否存在网络连接。即, 一旦空间被创建, 则即使参与者当前未连接或不在线时, 该参与者也自由地与该空间交互。在参与者连接和/或上线时, 任何改变都被更新到其他参与者空间。

此外, 共享空间应用程序使任何空间参与者都能够任何时候添加、修改、创建表达, 而不要求其他参与者加入会话。因此, 共享空间应用程序允许一定程度的自由度, 从而允许所有参与者在他们选择的任何时候进行自我表达。同样, 共享空间应用程序允许表达接收者在他们选择的任何时候进行响应的自由。没有立即响应的直接的或蕴含的义务。



共享空间应用程序可以提供持久画布，其中所有参与者表达都是在单个显示器上可见的。例如，超移动个人计算设备的显示器可被用来显示共享空间，其中用户表达可以持久存储在显示器中。用户不必来回滚动以寻找所需信息，因为表达（包括隐藏的表达）包含在空间画布和显示器的可视区域中。共享空间被配置成对所有在线的并且打开该空间的参与者而言基本上在视觉上是相同的。

另外，共享空间应用程序被配置成使所有参与者实时地或基本上实时地看到对共享空间的编辑和其它修改（例如，取决于连接、带宽和其它因素）。用户可以使用笔或手指通过在空间画布上拖曳笔或手指（称为“划”），来在空间的任何位置处绘制任何手写笔划。用户可以通过按下指示笔的修改器按钮或用手指来画出涂写笔划（称为“划后”（metastroking））来擦除。共享空间应用程序被配置成允许所有参与者在编辑过程发生时都看到它。例如，参与者在字符被键入时可以看到字符（例如，你看到改正）、在墨水被绘制（和擦除）时看到墨水等。因此，共享空间应用程序创建许多其它应用程序中缺少的在场的感觉。

如在此所述，共享空间应用程序向用户提供使用情感上有表现力和/或被动的通信来保持联系的机制，但不限于此。由于商务关系、家庭和朋友分散在更大的距离上，共享空间提供方便的而非打扰的和强制的通信方式。例如，考虑家庭，其中家庭成员居住在国家的不同部分。整个家庭可以通过使用共享空间来彼此通信和参与。兄弟姐妹们可以张贴重要的生活事件的照片或只是普通的日常事件。其他家庭成员也可以使用该共享空间来对照片进行评论、寻求建议和/或共享观点。自然地作为注释、图画、个人笔记、视频、和/或音频剪辑等的交互流由各参与者添加。多个参与者无论在何时查看共享空间，他们还可以偶然参与实况连接。

在另一示例中，考虑由彼此依赖以向消费者提供重要服务的多个企业单元所组成的企业。企业单元位于世界的不同部分。并非使用不可靠的电子邮件或电话通信，该企业的每一雇员在超移动个人计算设备上运行共享空间应用程序。雇员可以有策略地设置和监控该企业的各重要对应物之间的一个或多个共享空间。例如，产品组可以设置与策略业务计划者通信以

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将新设备投放市场的共享空间。自然地作为注释、墨迹、图画、图像、个人笔记、视频、和/或音频剪辑等的交互流由各参与者添加。如果各方碰巧同时有空，则用户还可以使用共享空间应用程序来参与实况音频和/或视频会话。

#### 示例性操作环境

现在参看图 6，以下讨论旨在提供对在可以实现本发明实施例的合适计算环境的简要一般描述。尽管将在结合在个人计算机上的操作系统上运行的应用程序执行的程序模块的一般上下文中描述本发明，但本领域的技术人员可以认识到，本发明也可结合其它类型的计算系统和程序模块实现。

一般而言，程序模块包括执行特定任务角色或实现特定的抽象数据类型的例程、程序、对象、组件、数据结构和其它类型的结构。而且，本领域的技术人员可以理解，本发明方法可以使用其它计算机系统配置来实现，包括手持式设备、多处理器、基于微处理器或可编程消费电子产品、小型机、大型计算机等。本发明也可以在其中任务由通过通信网络链接的远程处理设备执行的分布式计算环境中实现。在分布式计算环境中，程序模块可以位于本地和远程存储器存储设备中。

现在参看图 6，将描述用于本发明各实施例的示例性操作环境。如图 6 所示，计算机 2 包括通用台式机、膝上型计算机、手持式计算机、或能执行一个或多个应用程序的其它类型的计算机。计算机 2 包括至少一个中央处理单元 8 (“CPU”)、包括随机存取存储器 18 (“RAM”) 和只读存储器 (“ROM”) 20 的系统存储器 12、以及将存储器耦合至 CPU 8 的系统总线 10。基本输入/输出系统包含如在启动过程中帮助在计算机中的元件之间传输信息的基本例程，并储存在 ROM 20 中。计算机 2 还包括用于储存操作系统 32、应用程序、以及其它程序模块的大容量存储设备 14。

大容量存储设备 14 通过连接至总线 10 的大容量存储控制器 (未示出) 连接到 CPU 8。大容量存储设备 14 及其相关联的计算机可读介质为计算机 2 提供非易失性存储。尽管此处包含的计算机可读介质的描述指的是大容量存储设备，诸如硬盘或 CD-ROM 驱动器，但本领域的技术人员应理解，计





算机可读介质可以是可由计算系统 2 访问或利用的任何可用介质。

作为示例而非限制，计算机可读介质可以包括计算机存储介质和通信介质。计算机存储介质包括以存储如计算机可读指令、数据结构、程序模块或其它数据等信息的任何方法或技术实现的易失性和非易失性、可移动和不可移动介质。计算机存储介质包括，但不限于，RAM、ROM、EPROM、EEPROM、闪存或其它固态存储器技术、CD-ROM、数字多功能盘（DVD）或其它光学存储、磁带盒、磁带、磁盘存储或其它磁性存储设备、或能用于存储所需信息且可以由计算设备 2 访问的任何其它介质。

根据本发明的各个实施例，计算机 2 可使用通过诸如局域网、因特网等的网络 4 与远程计算机的逻辑连接在联网环境中操作。计算机 2 可以通过连接至总线 10 的网络接口单元 16 来连接到网络 4。应理解，网络接口单元 16 也可用于连接至其它类型的网络和远程计算机系统。计算机 2 也可包括用于接收和处理来自包括键盘、鼠标、笔、手指、和/或其它手段等多个输入类型的输入的输入/输出控制器 22。类似地，输入/输出控制器 22 可以向显示器、打印机或其它类型的输出设备提供输出。另外，触摸屏可以用作输入和输出机制。

如前简述的那样，多个程序模块和数据文件可以存储在计算机 2 的大容量存储设备 14 和 RAM 18 内，包括适于控制联网个人计算机操作的操作系统 32，诸如来自华盛顿州雷德蒙市的微软公司的 WINDOWS XP 操作系统。大容量存储设备 14 和 RAM 18 还可以存储一个或多个程序模块。具体地，大容量存储设备 14 和 RAM 18 可储存应用程序，诸如文字处理应用程序 28、成像应用程序 30、电子邮件应用程序 34、绘图应用程序等。

应当了解，各种实施例的逻辑操作可被实现为(1)运行于计算机系统上的一系列计算机实现的动作或程序模块，以及/或者(2)计算机系统内互连的机器逻辑电路或电路模块。该实现是取决于实现本发明的计算机系统的性能要求来选择的。因此，包括相关算法的逻辑操作可被不同地称为操作、结构设备、动作或模块。本领域技术人员将认识到，这些操作、结构设备、动作和模块可用软件、固件、专用数字逻辑、及其任意组合实现，而不背离如本文中阐述的权利要求内陈述的本发明精神和范围。



200780042038.3

说明书 第23/23页

尽管已结合各个示例性实施例描述了本发明，但本领域普通技术人员将理解，可在所附权利要求的范围内对其作出许多修改。因此，并非旨在以任何方式将本发明的范围限于以上的说明，而是应该完全参照所附权利要求书来确定。



200780042038.3

## 说明书附图

第1/16页

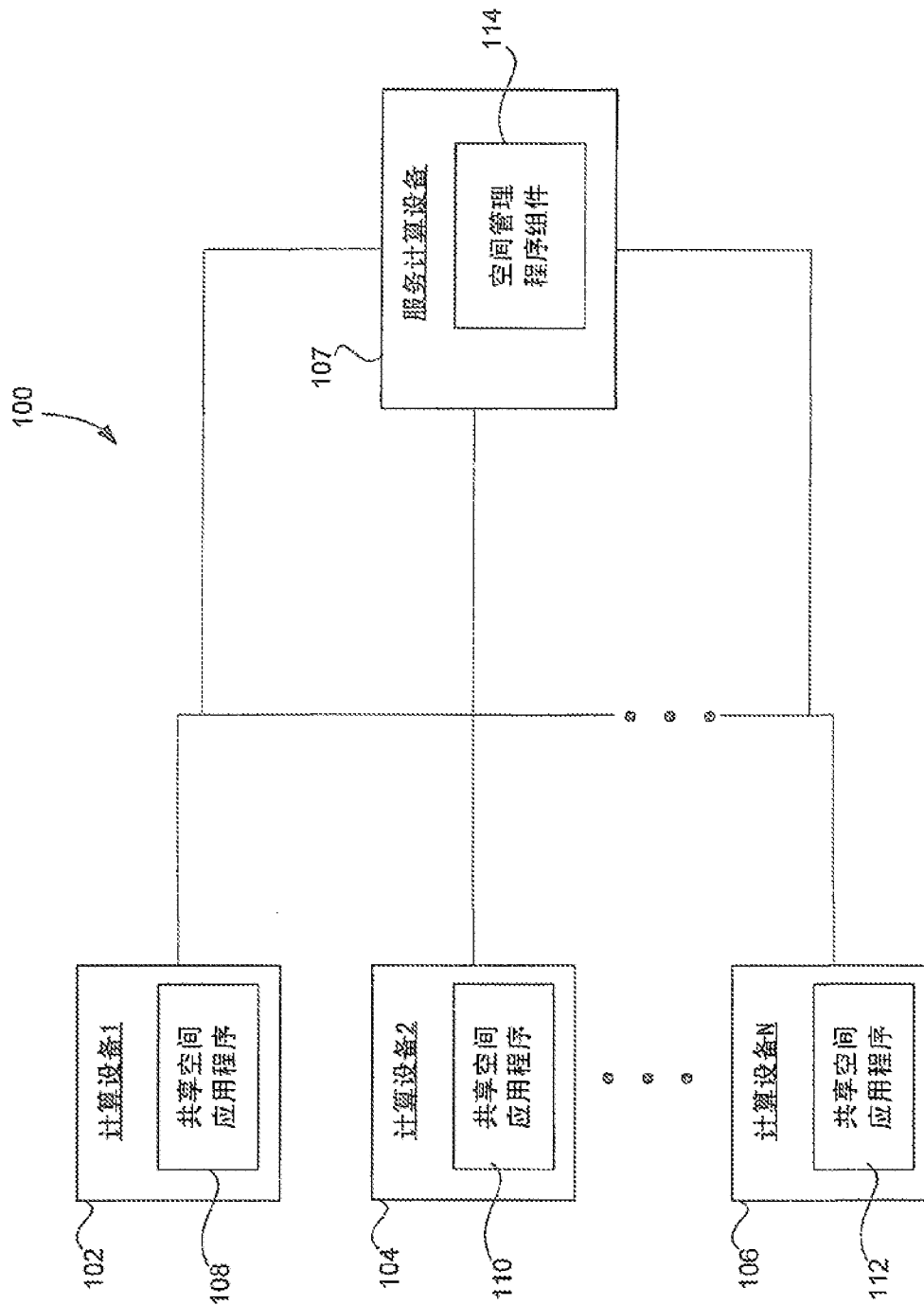


图 1

003





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说明书附图 第2/16页

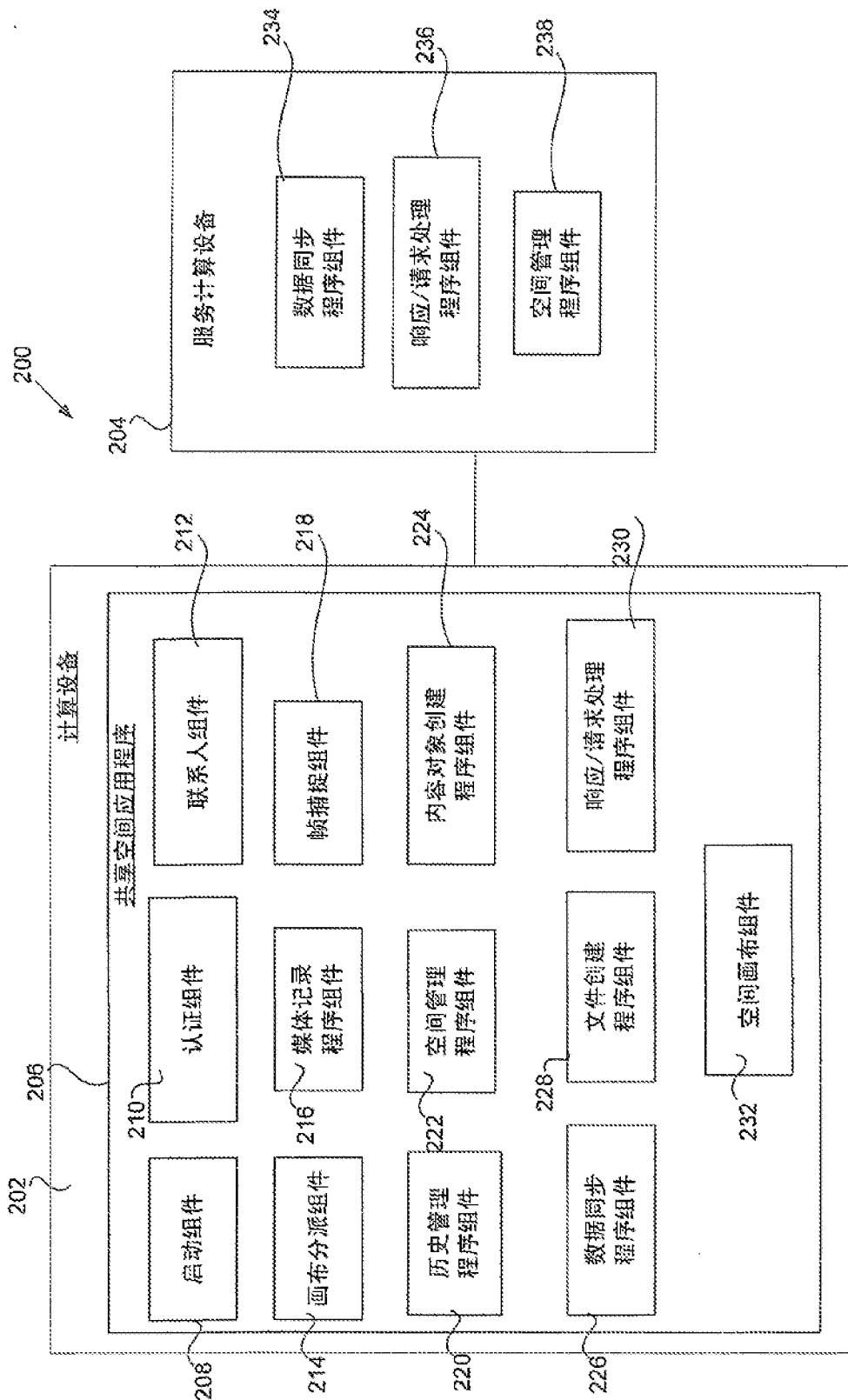


图 2



003

200780042038.3

说明书附图 第3/16页

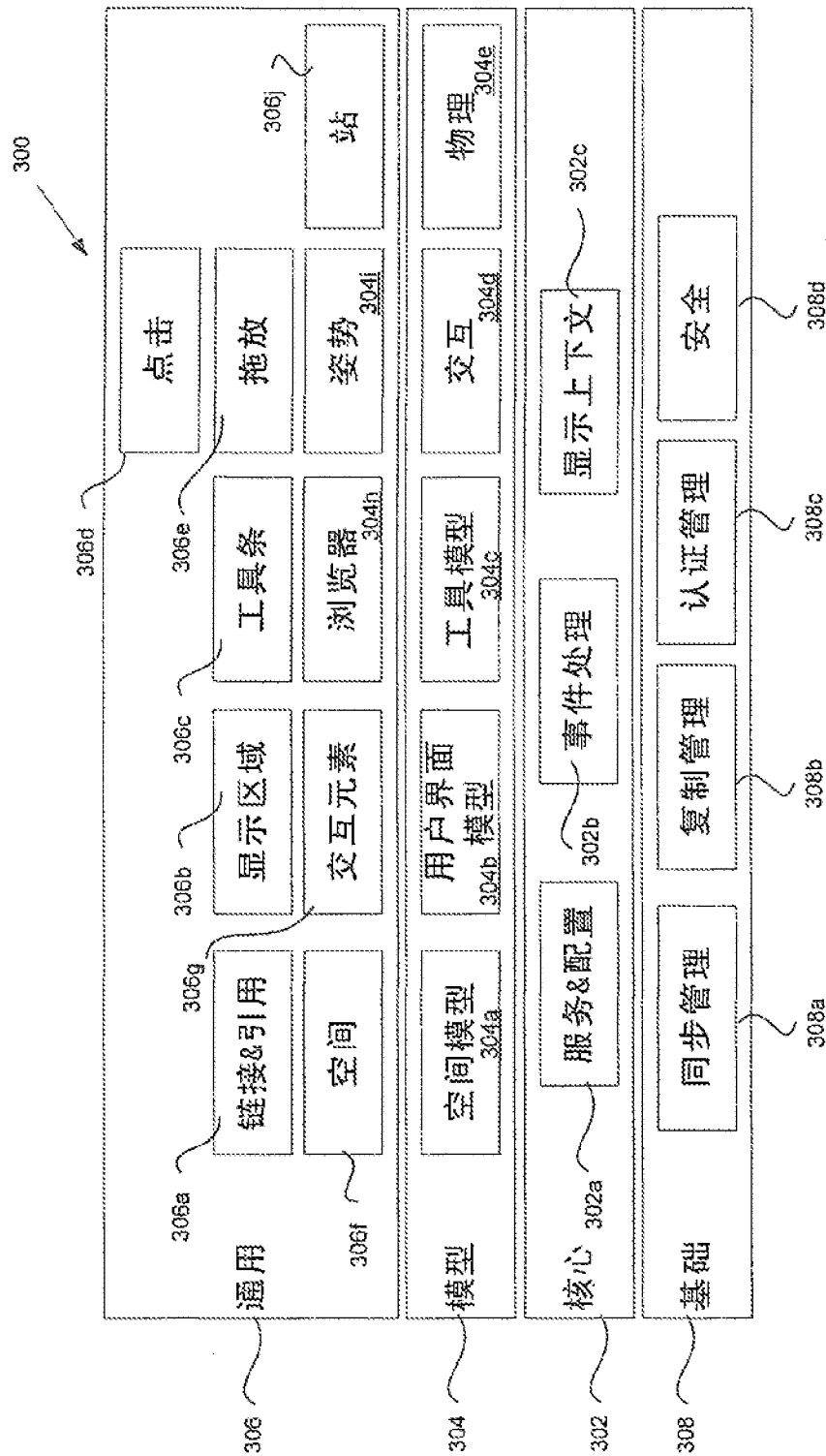


图 3

003



200780042038.3

说明书附图 第4/16页

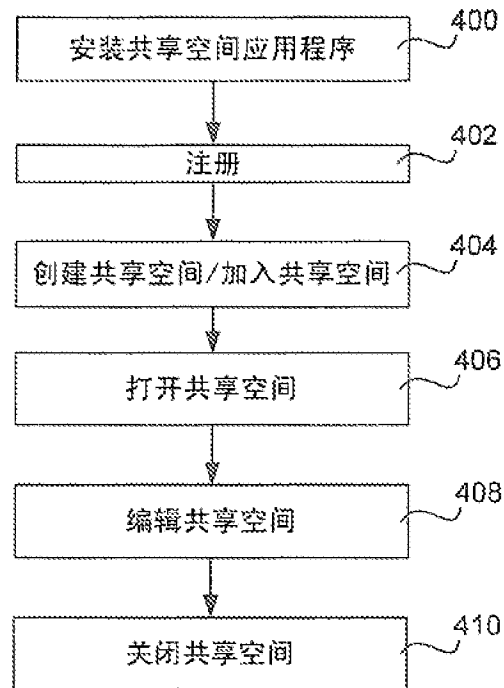


图 4

200780042038.3

说明书附图 第5/16页

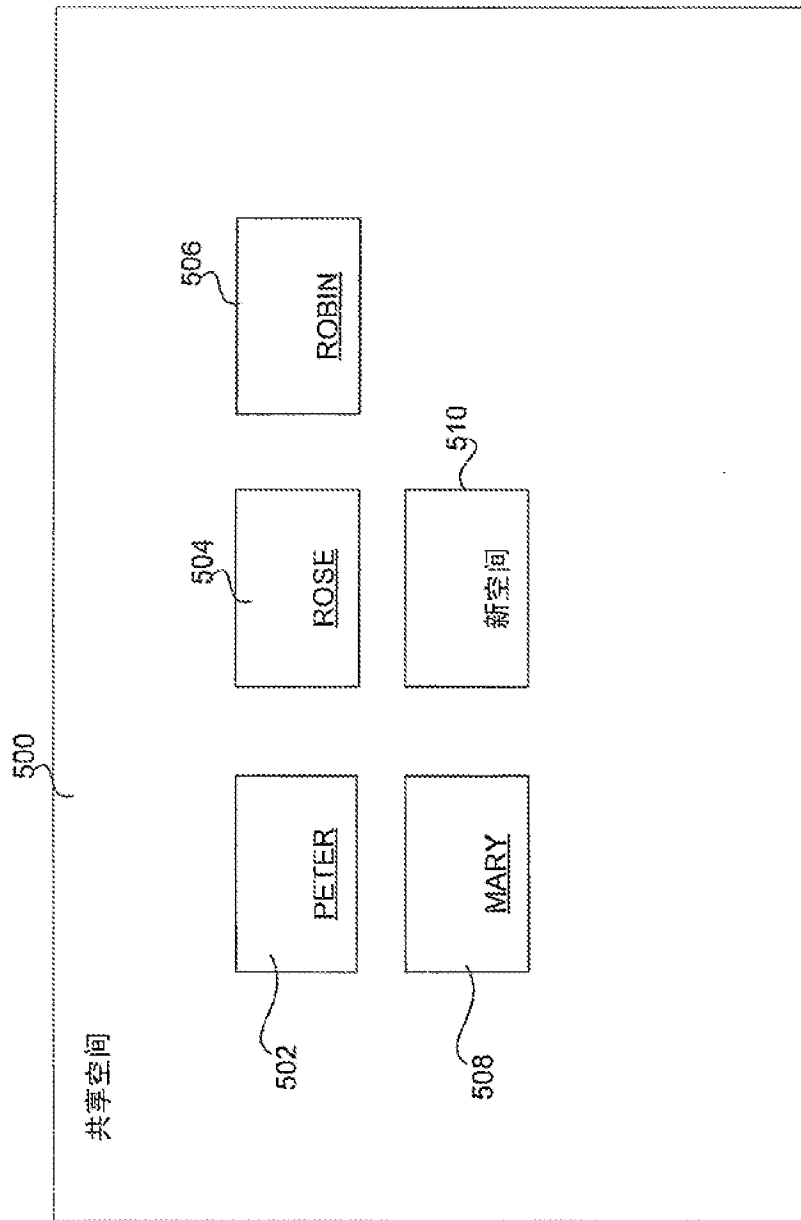


图 5A

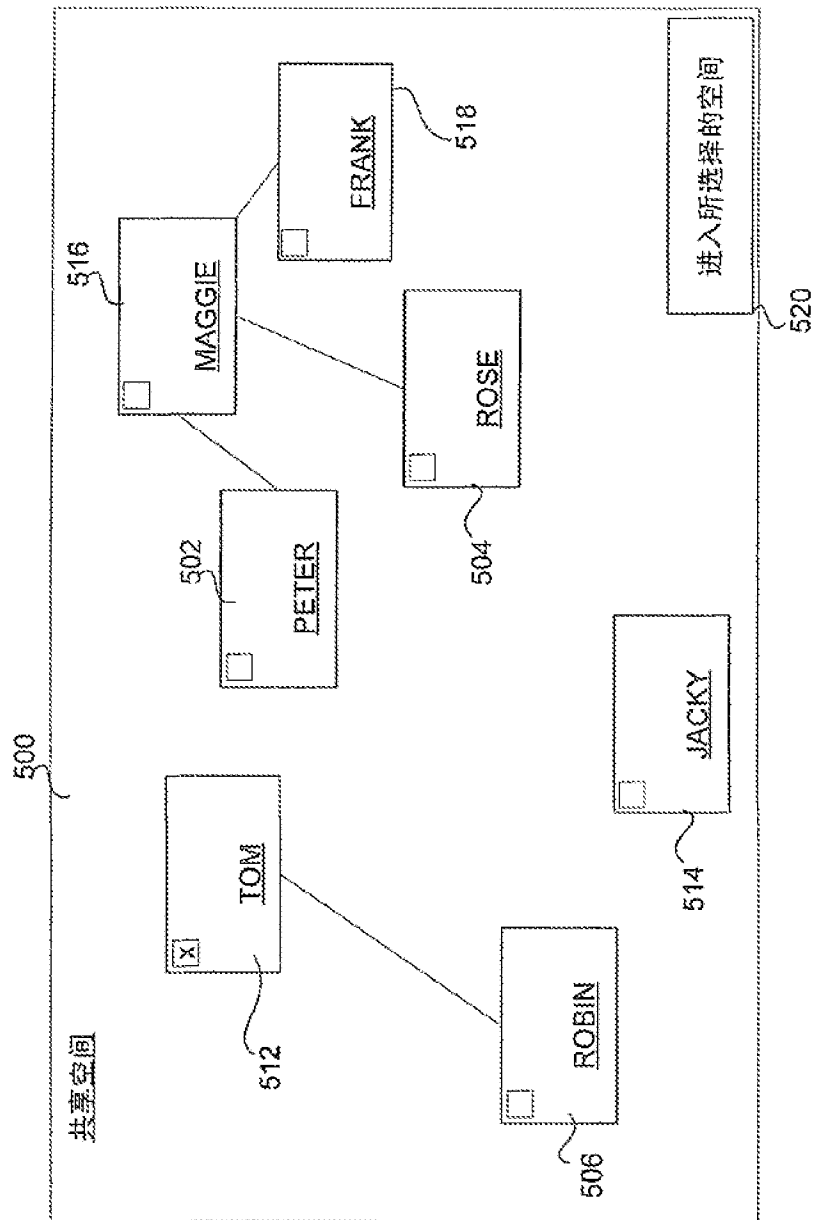


013

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说明书附图 第5/15页

邀请参与者



200780042038.3

说明书附图 第7/16页

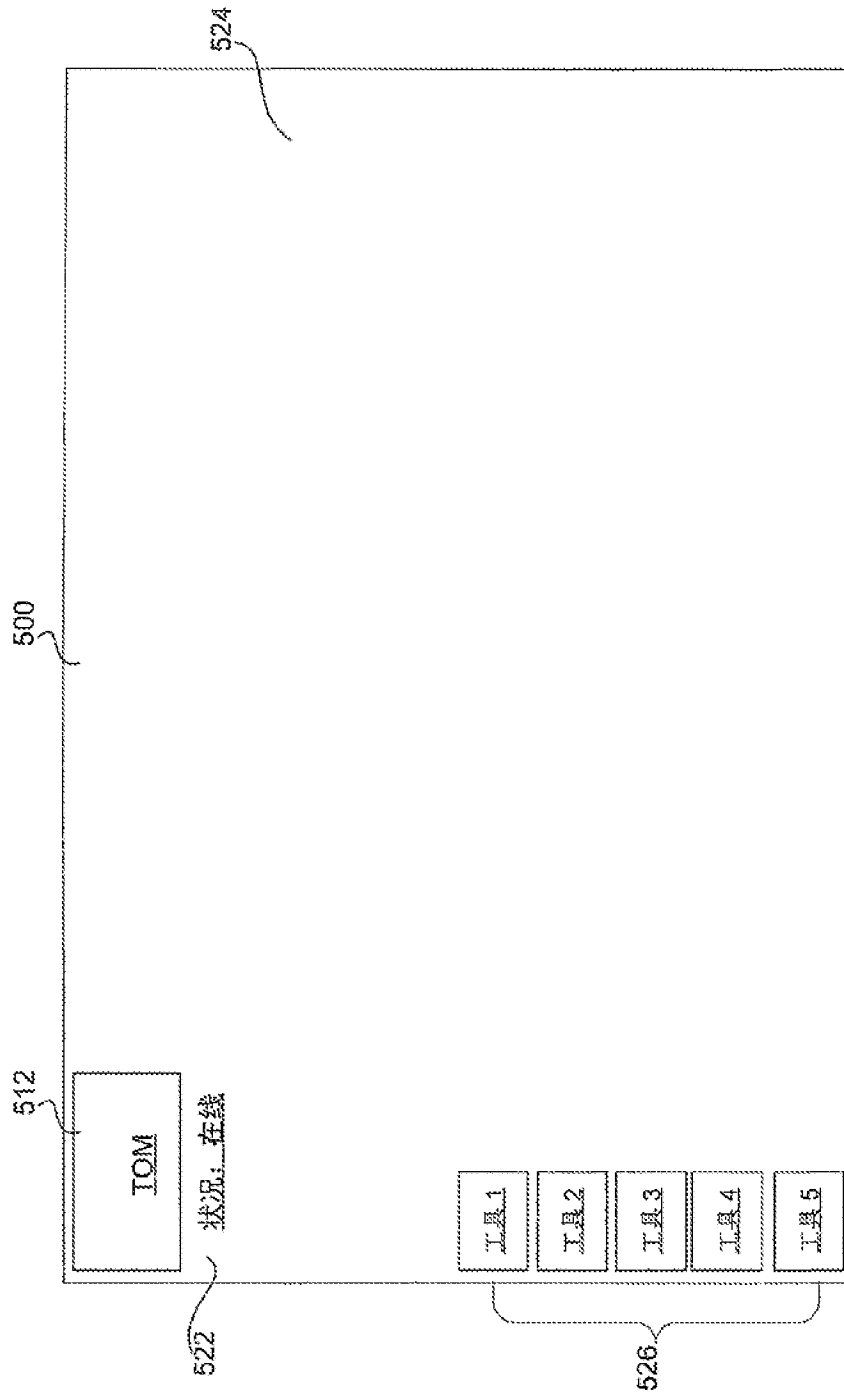
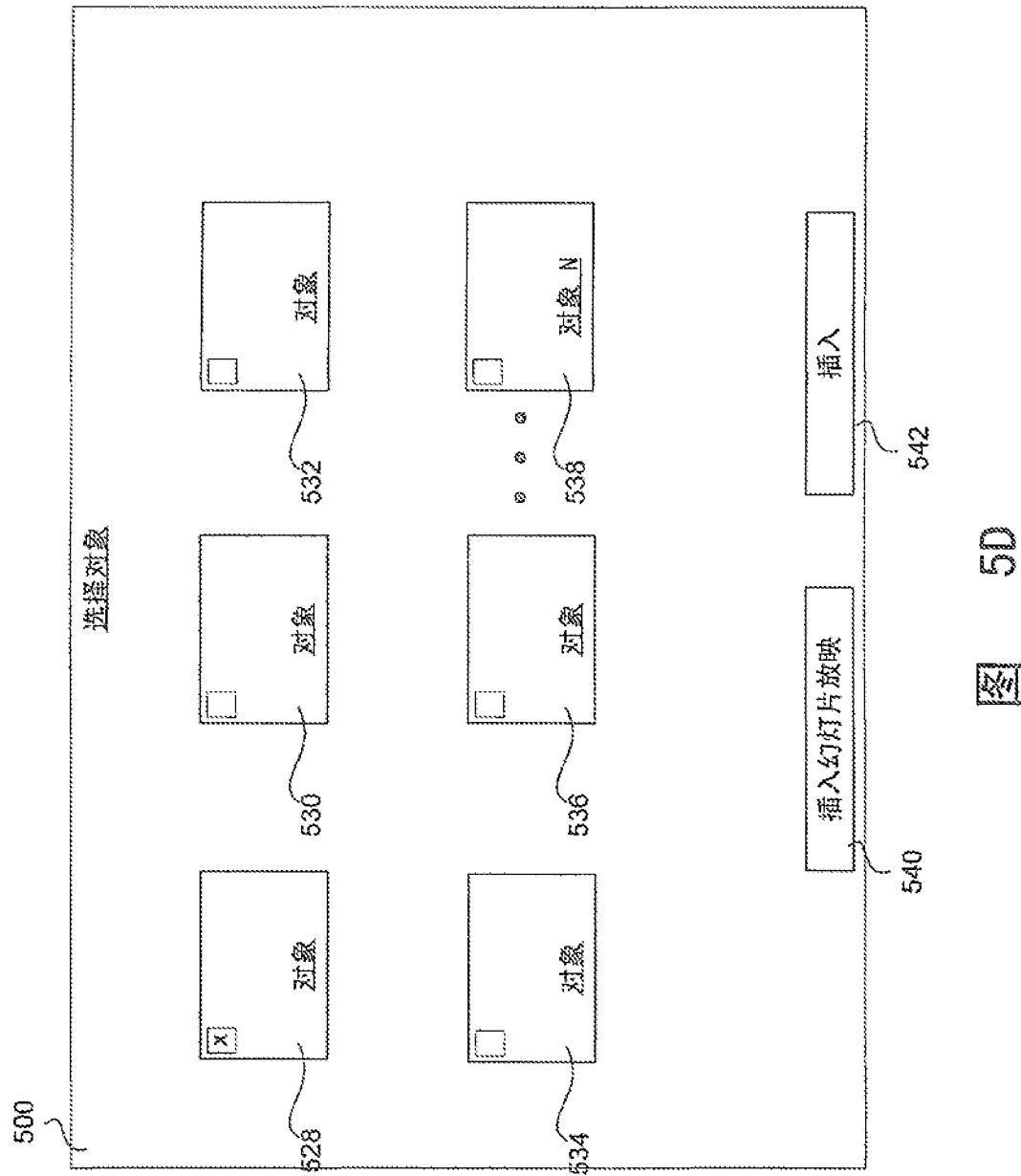


图 50



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说明书附图 第8/16页

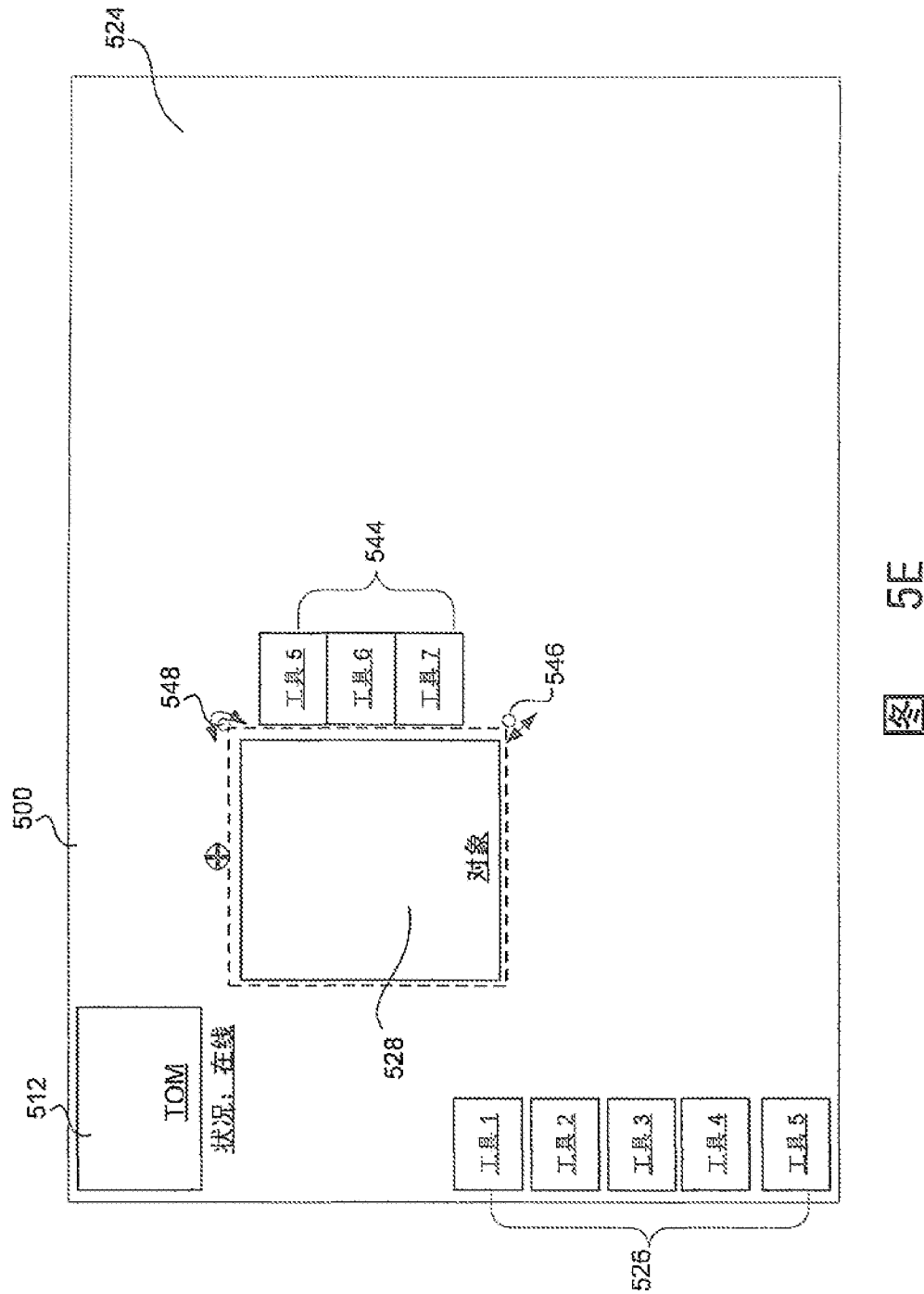


603



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说明书附图 第9/16页



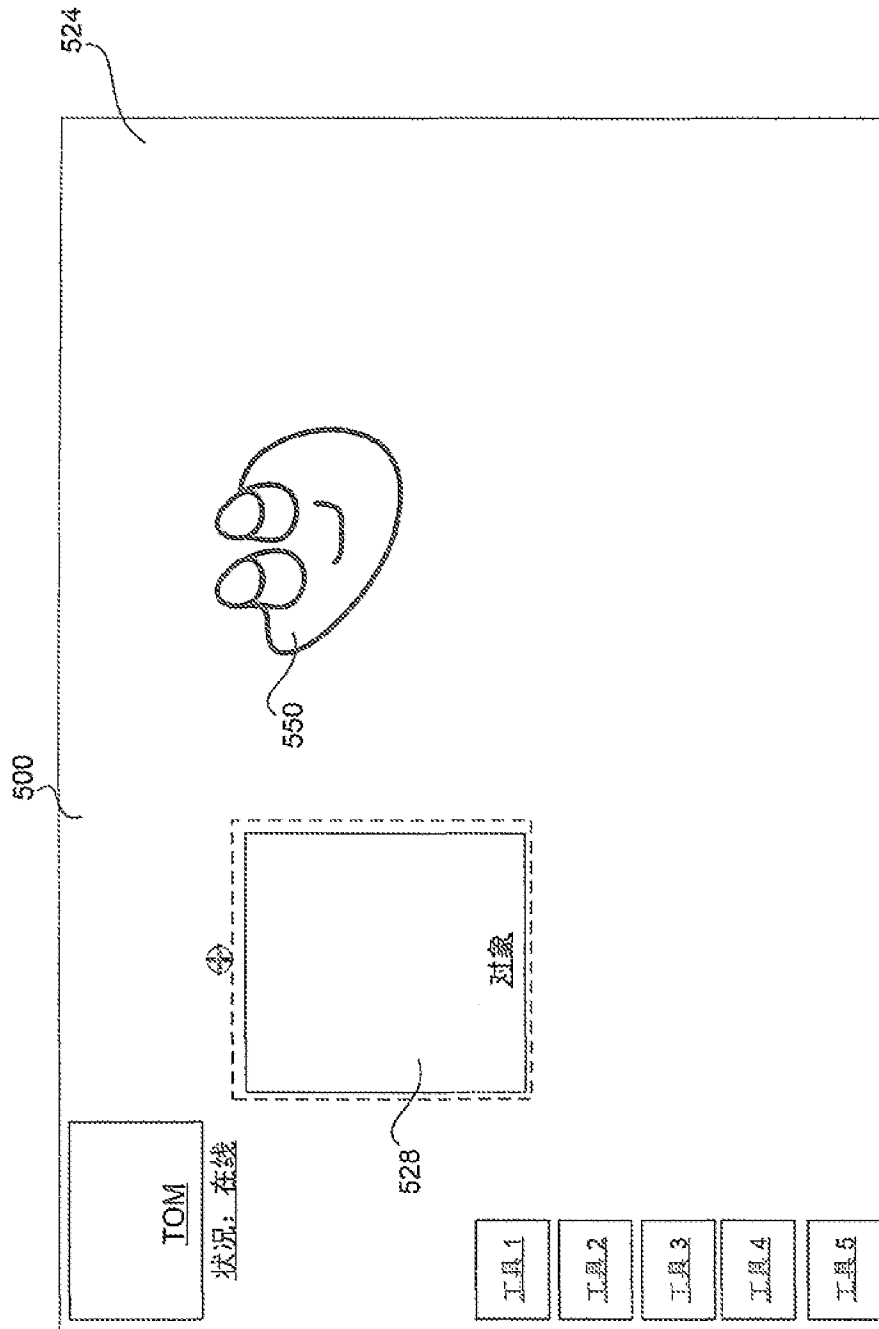
013





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说明书附图 第10/16页



423



5F



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说明书附图 第11/16页

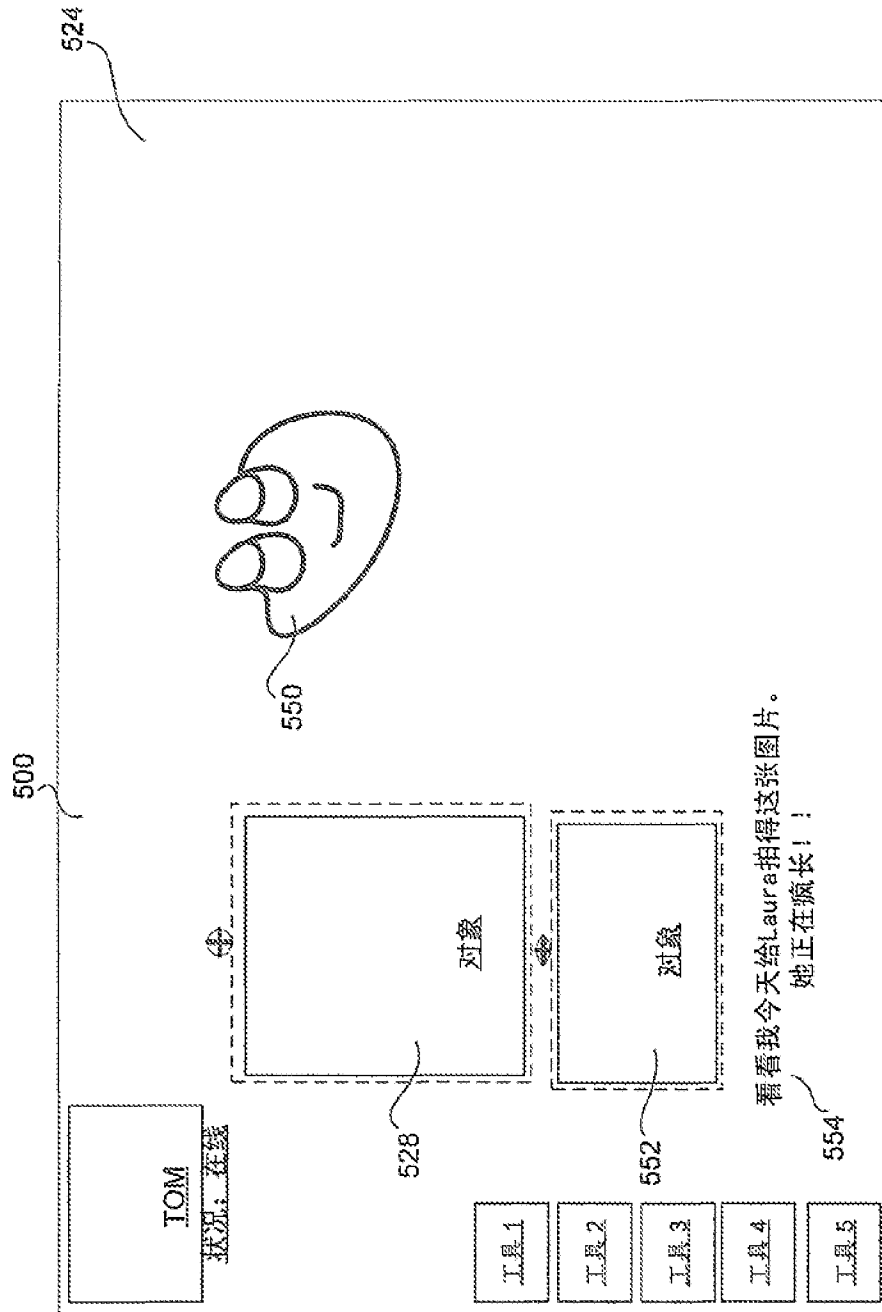


图 5G



209780042038.3

说明书附图 第12/16页

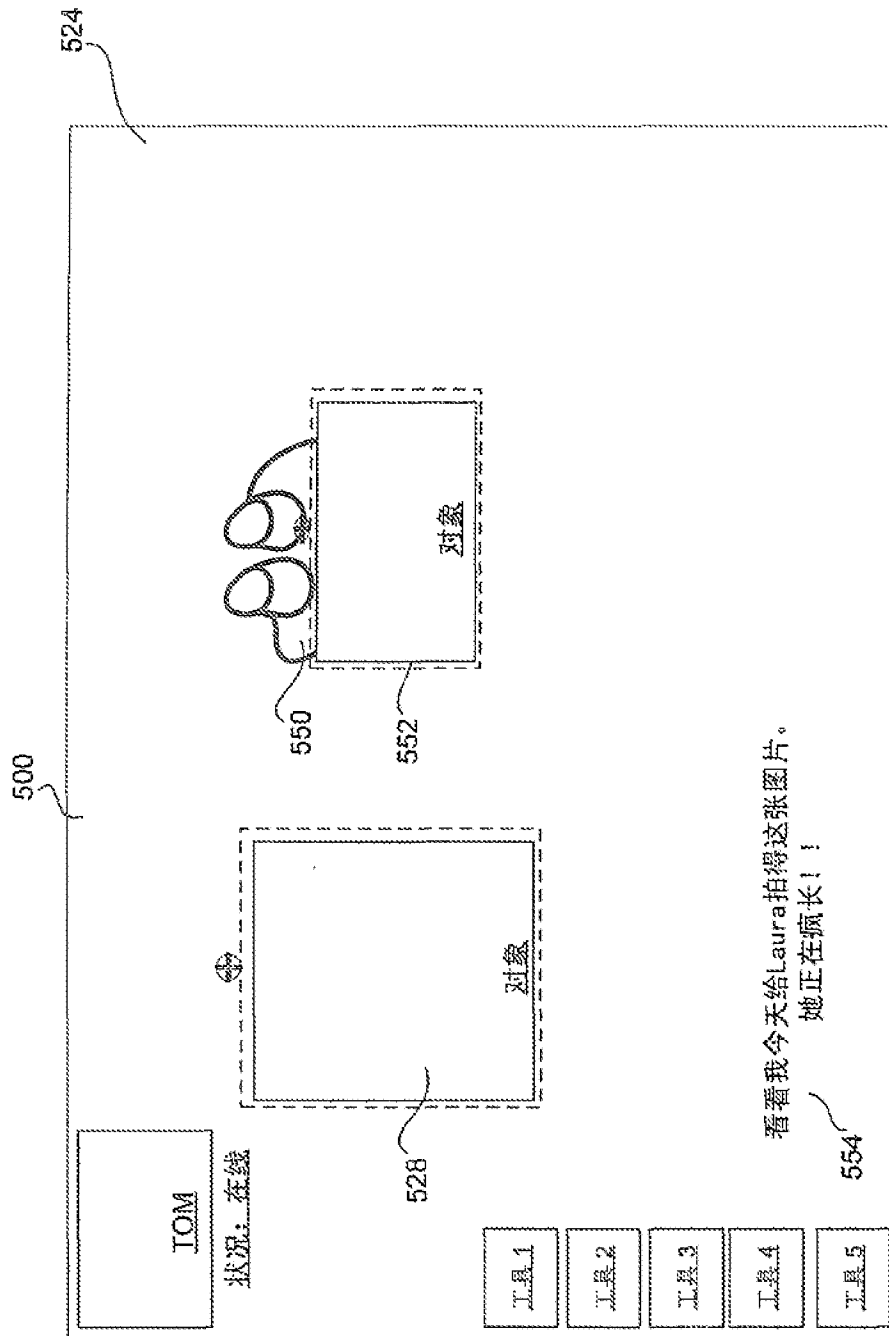


图 5H

043



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说明书附图 第13/16页

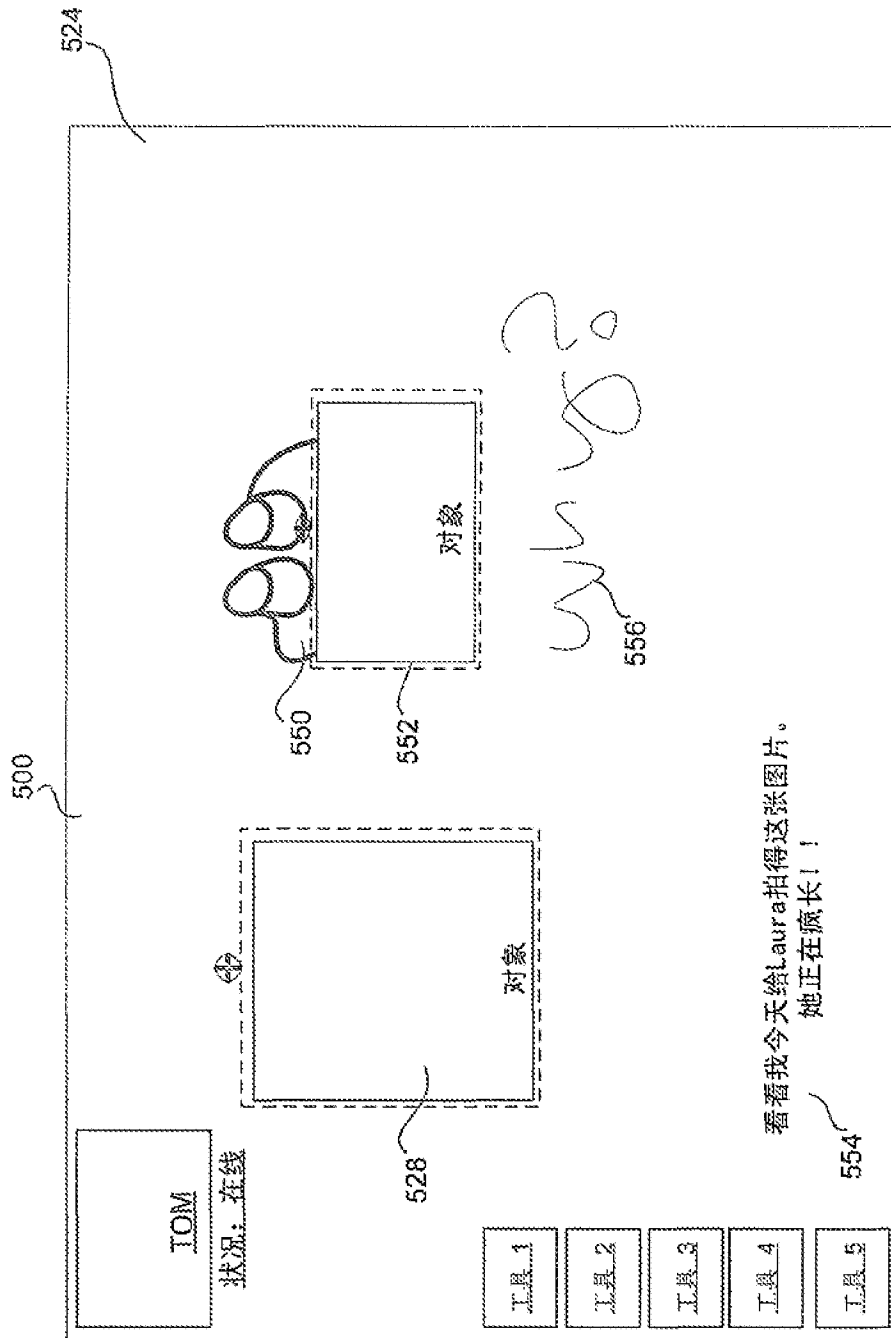


图 51



200780042038.3

说明书附图 第14/16页

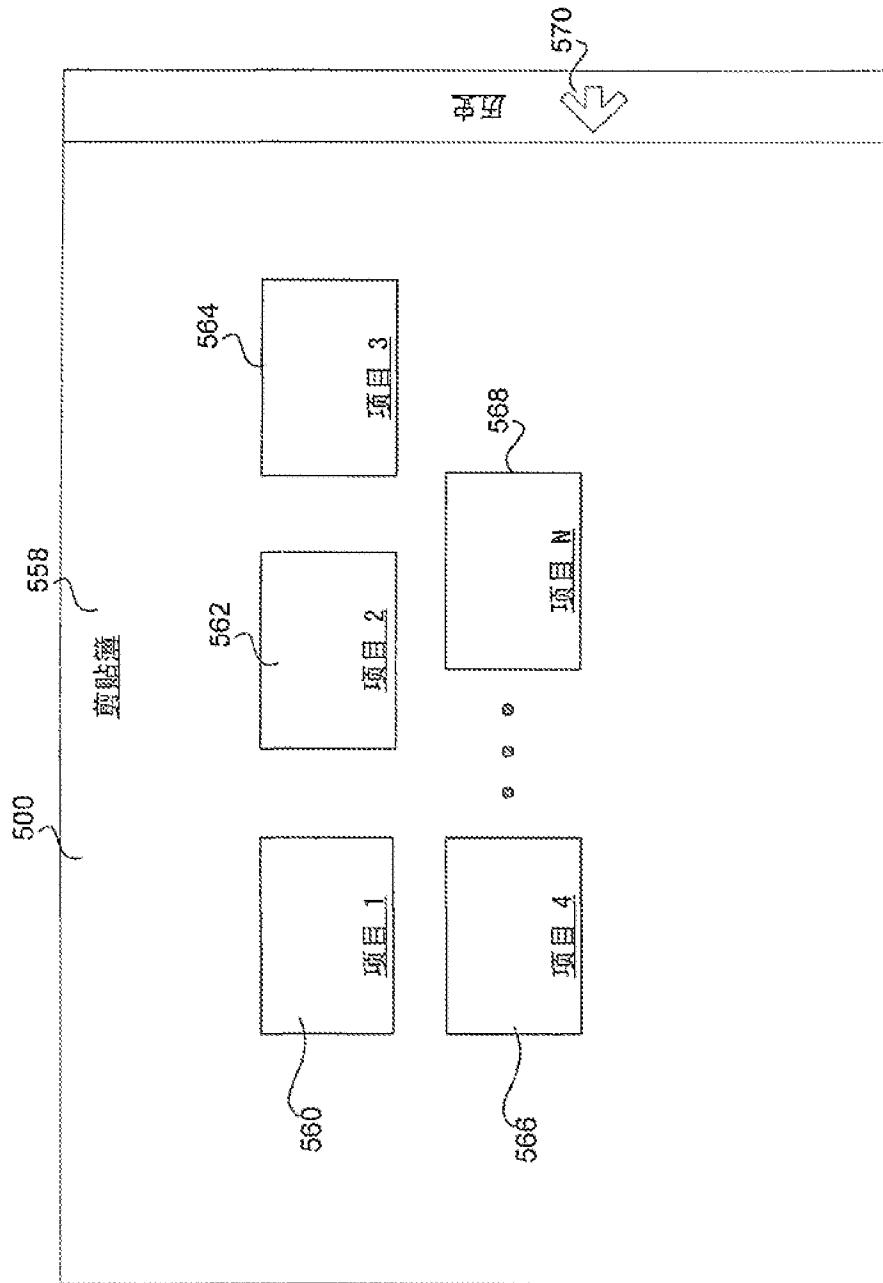
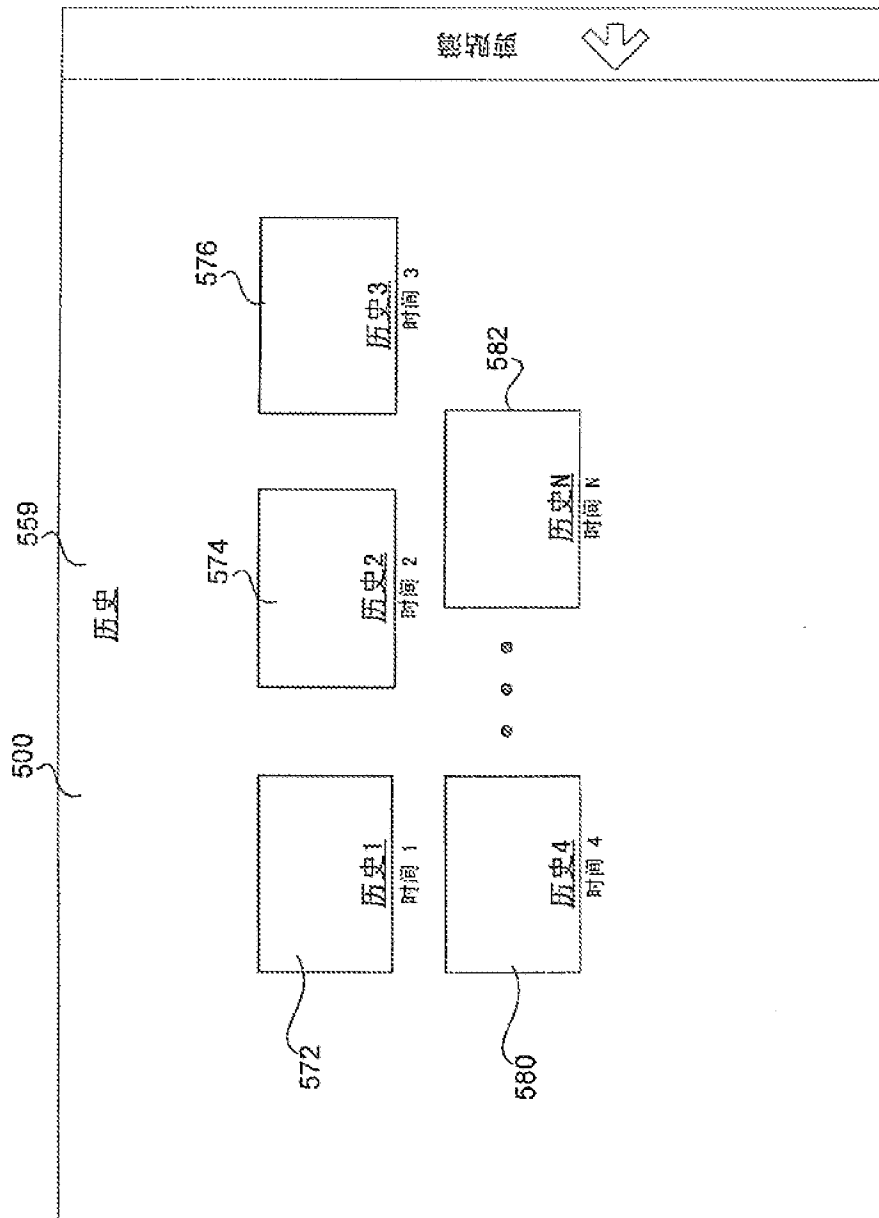


图 5J



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说明书附图 第15/16页



5K

073



200780042038.3

说明书附图 第16/16页

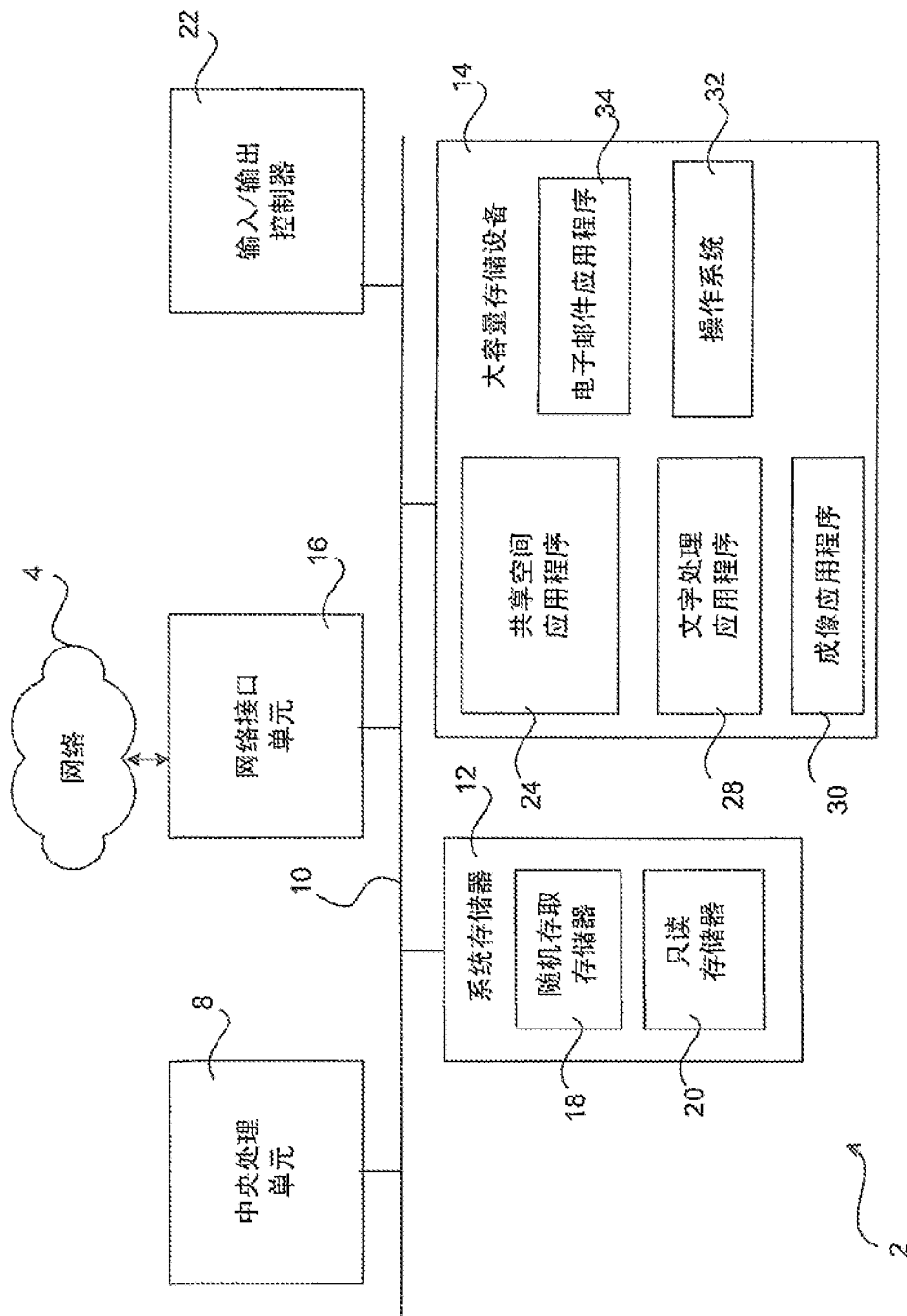
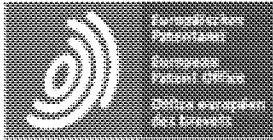


图 6

133





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## Notice

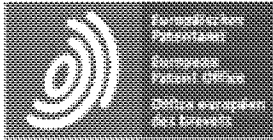
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## ABSTRACT CN101729850A

[1]

13 The invention discloses a video communication method based on handwriting characteristic data flow. In the process of video communication, all participants use the Soft Artboard as a collaboration platform. The handwriting feature parameters of their writing and drawing on the Soft Artboard are quickly collected, encoded into a handwriting feature data stream, and sent to remote clients in real time through the network. The remote terminal immediately decodes the received data, adjusts the decoded note feature parameters according to the difference in display resolution between the receiver and the sender, and draws corresponding graphics; remote participants can modify the graphics and Comment, his comments are also sent to the rest of the participants. The video communication based on the technical solution of the present invention only needs a very small network bandwidth to ensure clear, smooth and clear images during the conference, and greatly overcomes the problems of huge investment, high operating costs, complex algorithms and unclear images in the prior art. At the same time, it can achieve a deep level of communication and exchange between participants.





# Patent Translate

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## DESCRIPTION CN101729850A

*10* Video communication method and processing system based on handwriting feature data stream

[0001]

*14* technical field

[0002]

*18* The present invention relates to a video communication method and processing system based on handwriting feature data stream, in particular, the present invention relates to a video communication method in which handwriting feature parameters of a picture formed on a soft drawing board are used as video processing objects in a network environment A method and a processing system therefor.

[0003]

*25* Background technique

[0004]

*29* Various meetings occupy a lot of working time of the company's employees, and also cost the company a high cost.

*31* How to effectively use the meeting time and save the expenses during the meeting has been paid more and more attention by enterprises as an effective means to increase productivity and save costs.

[0005]

*36* Every business needs the free exchange of information and opinions to improve their products and services.

*37* Effective communication and collaboration between people on and off the team can improve product quality,

improve product or project development lead times, and reduce costs. However, communicating quickly and effectively is often difficult to achieve, especially in multinational corporations. A key factor that hinders rapid and effective communication is often that people are geographically diverse. Often, people can spend large sums of money and days on the road for a one- or two-hour meeting, especially when there are cross-border or cross-continental conferences.

[0006]

46 To this end, there is an urgent need for a way to make it easy for stakeholders who are not in the same geographical location to participate in the meeting, express personal opinions and share the opinions of others in real time.

49 This is a video conferencing system. The current video conference system can be divided into two types: soft terminal and hard terminal. Although the video conference picture provided by the video conference system based on the hard terminal is clear and smooth, this kind of system is not only expensive in hardware equipment, but also requires a lot of bandwidth during the meeting, over LAN and ATM networks. This limits the wide application of this conference system. The Internet-based soft terminal video conferencing system uses a camera and a microphone as video and audio input devices. It usually takes up more than 400Kbps of bandwidth to transmit one channel of video and audio with a resolution of CIF. It is very difficult to meet such bandwidth everywhere in the Internet network, and many of these video conferencing products transmit several channels of video at the same time, or even a dozen channels of video, not to mention cross-border or cross-continental video conferences. Of course, some companies try to introduce some kind of technology to reduce the need for video conferencing bandwidth, such as: Patent No. CN1525300A, "System and Method for Real-time Whiteboard Streaming Technology"; Patent No. CN1555197A, "Internet-Based Video Conference Sharing Whiteboard Implementation Method"; Patent No. CN101005600A, "Conference System Using Whiteboard" and so on. However, none of these approaches inherently address the bandwidth requirements of video conferencing.

[0007]

67 The maturity of network technology provides the technical foundation for the development of network education.

69 At present, all regions and countries in the world pay attention to and intervene in virtual universities and online teaching models to varying degrees, but the development is extremely uneven. There are hundreds of universities around the world offering online teaching courses. 52.6% of these universities offering online courses are in North America, 23.9% in Europe, 10.6% in Oceania, 7.5% in Asia, 4.8% in Latin America and the Caribbean, and 0.6% in Africa. A key reason for this phenomenon is that the current network education relies on a large network bandwidth, and the global network resources are mainly distributed in North America.

[0008]

79 Also, in the current video conference or online class, it is very inconvenient (or not at all) for conference

participants or online class participants to modify the graphics displayed in the user window to feedback their different opinions, which is extremely limited. In-depth communication and communication with all meeting participants or class participants.

[0009]

<sup>86</sup> SUMMARY OF THE INVENTION

[0010]

<sup>90</sup> In order to overcome the deficiencies of the existing video communication technology, reduce the demand for network bandwidth for video communication as much as possible, and ensure that the picture is clear, smooth and clear during the video conference, the present invention abandons the traditional video communication technology. The processing method is adopted, and the processing method that takes the handwriting characteristic parameters when forming the picture as the processing object is adopted.

<sup>95</sup> In the process of communication, all video communication participants use the Soft Artboard as a collaboration platform to express their own views and opinions by writing, drawing, or drawing on the Soft Artboard, so as to achieve in-depth discussions and exchanges; and , only a minimal network is required to ensure clear, smooth and clear sound during video conferences.

[0011]

<sup>102</sup> In order to achieve the above-mentioned purpose, the technical scheme of the present invention is as follows: a video communication method based on handwriting characteristic data stream, the communication method involves two or more communication participants (for the convenience of discussion, in the present invention, send the The terminal that generates video communication data (that is, the terminal that generates the data) is called the local terminal, and the terminal that receives the video communication data is called the remote terminal). It is initialized on the soft artboard of these terminals, that is, only the background is displayed on the soft artboard of these terminals.

<sup>109</sup> The soft drawing board mentioned in the present invention refers to a user window (also referred to as a user interface and a display window), which belongs to software.

<sup>111</sup> When the local end detects that the user has penned, the local end immediately processes the data. The steps are as follows:

[0012]

<sup>116</sup> A. Collect data: collect the handwriting feature parameters of local users when they write;

[0013]

<sup>120</sup> B. Graphic drawing: that is, according to the collected handwriting characteristic parameters, the corresponding graphics are drawn on the soft drawing board;

[0014]

125 C. Data encoding: perform lossless encoding on the locally generated handwriting feature parameters, and process them into a handwriting feature data stream;

[0015]

130 D. Data sending: send the locally generated handwriting feature data stream to other remote terminals participating in this video communication through the network.

[0016]

135 When the remote end receives the handwriting feature data stream, it immediately performs corresponding processing. The processing steps are as follows:

[0017]

140 E. Data decoding: decode the received handwriting feature data stream to obtain handwriting feature parameters;

[0018]

145 F. Data pre-processing: If the resolution of the display screen of the receiving data terminal is different from that of the sending data terminal, the decoded note feature parameters need to be adjusted accordingly before drawing the graphics;

[0019]

151 G. Graphic drawing: draw corresponding graphics on its own soft drawing board according to the note feature parameters.

[0020]

156 If a remote participant has different opinions, he can modify the picture displayed on the soft artboard, then his communication device becomes the local end, and the terminals of other video communication participants become the remote end, and return to step A.

[0021]

162 Like drawing on an ordinary drawing board, the graphics on the soft drawing board are enriched with the increase of handwriting feature parameters during the communication period, that is, the present invention

adopts incremental drawing of graphics—when the handwriting feature parameters are received, the graphics increase accordingly. part, otherwise the graph will remain unchanged.

166 As can be seen from the above description, in the present invention, the local end and the remote end are opposite, and the local end generates data in the process of video communication. It not only needs to draw graphics according to the handwriting feature parameters generated locally, but also needs to encode the handwriting feature parameters into handwriting. The feature data stream is sent out in real time; the remote end immediately decodes the received handwriting feature data stream. If the resolution of its display screen is different from that of the sender (ie, the local end), it needs to be Adjust the decoded handwriting feature parameters accordingly, and draw the corresponding part of the graph; if the remote end modifies the graph displayed on the soft artboard, it becomes the local end, and the original local end becomes the remote end end.

[0022]

178 Another object of the present invention is to provide a video communication processing system based on handwriting feature data stream, video communication using the processing system requires only a very small network bandwidth to ensure clear picture, smoothness and clear sound during the video conference.

[0023]

184 In order to achieve this purpose, the technical solutions of the present invention are as follows: a video communication processing system based on handwriting feature data stream, the processing system involves two (or more than two) communication terminals, and is characterized in that all communication terminals include a collection The data module is used to collect the handwriting feature parameters of the local user when writing; the data encoding module is used to losslessly encode the locally generated handwriting feature parameters, and process them into a handwriting feature data stream; The feature data stream is sent to the other remote terminals participating in this video communication; the data receiving module receives the handwriting feature data stream transmitted from the far end of the network; the data decoding module decodes the received handwriting feature data stream to obtain the handwriting feature parameters; the data preprocessing module adjusts the decoded note feature parameters according to the difference between its own display screen resolution and the sender's screen resolution; the graphics drawing module draws the corresponding notes on the soft drawing board according to the note feature parameters graphics.

[0024]

198 The above-mentioned handwriting feature parameters are composed of three parameters, such as the coordinates of the point where the pen is touched, the pressure (level) of the pen at that time, and the color of the pen.

202 Without causing confusion, these three parameters will be referred to simply as coordinates, pressure levels, and colors, respectively.

204 The coordinates indicate a specific position of the pen tip in the picture when drawing; the pressure level indicates the pressure applied to the pen tip when drawing, and what is displayed on the picture is the

thickness of the handwriting or the concentration of the ink, or the width of the line; the color is the drawing color used in the process.

- 208 The present invention defines the combination of these three parameters (coordinates of the stroke point, the pressure (level) of the pen at that time, and the color of the pen) as the handwriting feature parameter, that is, the processing object in the present invention.
- 211 In the process of communication, the three components of the handwriting feature parameters are collected in real time, and the collected handwriting feature parameters are encoded in real time, that is, processed into a handwriting feature data stream, and the handwriting feature data stream is sent to the remote client through the network.
- 215 The remote client immediately decodes the received handwriting feature data stream to obtain the same handwriting feature parameters as the sender. After adjusting accordingly, a graph similar to that of the sender can be drawn.
- 218 Since the three components (coordinates, pressure level, and color) that make up the handwriting feature parameters are only slightly different, the drawn graphs will be very different, so the lossless encoding method is used when encoding the handwriting feature parameters, that is, The data before encoding is exactly the same as the data after decoding.

[0025]

- 225 The method according to the present invention has many advantages: 1) It discloses a very promising data processing method that takes the handwriting when forming the picture as the processing object, and this processing method greatly reduces the data volume of video communication. Small size, which greatly reduces the bandwidth requirements for video conferences or online classrooms, and saves the operating costs of enterprises or educational institutions; 2) At the same time, this processing method enables all participants to meet in the same conference room. 3) This processing method also overcomes the fact that participants in traditional video conferences or online classes can only listen and comment, but cannot modify the content in the window (such as traditional hardware conference systems) Or it is inconvenient and inaccurate to modify the content in the window (such as pure software conference system), which also makes the wide application of video conference system or network classroom system possible, and also saves labor costs and facilitates students; 4) Realization The complexity of the algorithm of the present invention is very low, which enables portable products (such as smart phones) with relatively low processor performance to become the video communication terminal equipment of the present invention.

[0026]

- 241 In addition to the above-mentioned advantages, other advantages of the present invention can be further manifested from the following detailed description in conjunction with the accompanying drawings.

[0027]

- 246 Description of drawings



[0028]

250 FIG. 1 is a typical communication system diagram of a video communication method and system based on handwriting feature data flow.

[0029]

255 FIG. 2 is a process diagram of processing handwriting feature parameters during video communication of the video communication method and system based on the handwriting feature data stream.

[0030]

260 3a and 3b are flowcharts of encoding and decoding handwriting feature parameters in a direct manner.

[0031]

264 Fig. 4a and Fig. 4b are flowcharts of encoding and decoding handwriting feature parameters using a difference method.

[0032]

269 Fig. 5a and Fig. 5b are the encoding and decoding processes of the combination of the coordinate increment and the pressure level increment as the encoding object of the lossless encoding.

[0033]

274 Fig. 6a and Fig. 6b are respectively the encoding and decoding flow of the encoding object of lossless encoding with coordinate increment and pressure level increment.

[0034]

279 FIG. 7a and FIG. 7b show the encoding and decoding flow of the encoding target of the lossless encoding as the acceleration amount.

[0035]

284 detailed description

[0036]

288 In the following description of the preferred embodiments of the invention, reference is made to the accompanying drawings, which are incorporated in and constitute a part of the specification, and which

illustrate specific embodiments in which the invention may be employed.

291 It will be understood by those skilled in the art that other embodiments may be used or modified without departing from the spirit of the present invention.

293 None of this goes beyond the scope of the present disclosure.

[0037]

297 1. Model work environment

[0038]

301 A video communication method and system based on handwriting feature data flow generally has a server in a network-based environment and a plurality of client terminals arranged in the network-based environment.

303 Client terminals may be (but are not limited to) personal computers, server computers, hand-held or laptop devices, multiprocessor systems, microprocessor-based systems, set-top boxes, smart phones, tablet PCs, network PCs, microcomputers, mainframes computers, distributed computing environments including any of the above systems and devices.

307 Some of these client terminals have only basic configuration, and they can only play audio, video and recording.

309 Others are equipped with advanced equipment, such as projectors, coordinate detectors, etc. The coordinate detectors include (but are not limited to) electronic drawing boards, electronic whiteboards, mouse pens, and the like.

312 When participating in a video conference or an online class, the handwriting feature parameters drawn by the user using the coordinate detector on the soft drawing board are collected and processed into a handwriting feature data stream.

315 These handwriting feature data streams are sent to the server in real time through the network, and the server forwards the received data to the client terminals (such as PCs, smart phones, etc.) of the participants in remote video conferences or online classes, and their The coordinate detector modifies the content on the soft artboard, and the parts they add are also processed into handwriting feature data streams and sent back in the same way to the client terminals of remote participants, while in the progress of the meeting or class. They can express their opinions orally, and these oral opinions are captured by the audio capture device, compressed and encoded into an audio stream, and sent to the terminals of other participants in the same or similar way.

[0039]

326 Typical solutions of such a system include company video conferences and online classrooms opened by educational institutions (for the convenience of discussion, video conferences will be used as an example to illustrate).

329 As shown in FIG. 1, the video conference involves L people gathered in the meeting room 101 at place A, N people gathered in the meeting room 102 at place B, and M scattered remote users 104a-104m.

331 L people gathered in the conference room 101 are equipped with an electronic drawing board (which is an



input device) 111, a microphone device 112 for capturing conference audio, a projector 115, a personal computer 114, and a speaker 113 mounted on the microphone device, and the personal computer 114 is connected to the network connection 103 of the server 100 in the Internet network environment.

335 The equipment of the N people gathered in the meeting room 102 is similar to the equipment of the L people gathered in the meeting room 101, except that the coordinate detector equipped is an electronic whiteboard instead of an electronic drawing board.

338 M video conference participants distributed elsewhere can be in the office, at home, and possibly on a business trip.

340 They are equipped with personal terminals (such as personal PCs, laptops, smart phones, etc.), headphones with microphones, coordinate detectors (such as drawing pads, mouse pen, etc.), and a network connection capable of connecting to the server 100 .

343 All the people attending the meeting use the soft artboard as a collaborative space, and share their opinions by using the coordinate detector to write and draw on the soft artboard.

[0040]

348 2、 Video communication method based on handwriting feature data stream.

[0041]

352 As shown in Figure 2, when the video conference participant X uses the coordinate detector to write and draw a picture on the soft drawing board (that is, the pen), the local end immediately processes the data, and the steps are as follows:

[0042]

358 Step 211, collecting data: collecting the handwriting feature parameters of the local user when writing;

[0043]

362 Step 212, graphic drawing: that is, draw a corresponding graphic on the soft drawing board according to the collected handwriting feature parameters;

[0044]

367 Step 213, data encoding: carry out lossless encoding to the handwriting feature parameters generated locally, and process them into handwriting feature data streams;

[0045]

372 Step 214, data sending: send the locally generated handwriting feature data stream to other remote terminals participating in this video communication through the network.

[0046]

377 Another video conference participant Y is located at the network remote terminal, when the remote terminal receives the handwriting feature data stream (221), it immediately makes corresponding processing, and the processing steps are as follows:

[0047]

387 Step 222, data decoding, decoding the received handwriting feature data stream to obtain handwriting feature parameters;

[0048]

388 Step 223, data preprocessing, if the resolution of the display screen of the receiving data terminal is different from the resolution of the display screen of the sending data terminal, then it is necessary to make corresponding adjustments to the decoded note feature parameters before drawing the graphics;

[0049]

394 Step 224, drawing a graph, drawing a corresponding graph on its own soft drawing board according to the note feature parameters.

[0050]

399 If a remote communication participant has different opinions, he can modify the picture displayed on the soft artboard, then his communication device becomes the local end, and the terminals of other video communication participants become the remote end, and returns to step 211 .

[0051]

405 Of course, it is better to use different colors when different people modify the graphics on the soft drawing board, so as to remind all video conference or online class participants that new content is being or has been input on the drawing board.

[0052]

411 During the video communication, what they say is captured by a recording device, encoded into an audio stream and sent to the endpoints of the remote meeting participants.

413 After receiving the audio stream, the remote client terminal invokes the corresponding audio decoder to decode it into audio data, and plays it out through headphones and speakers.

[0053]

418 3.How handwriting data is handled

[0054]

422 When the customer writes and draws on the soft drawing board, the method of obtaining the handwriting feature parameters is as follows: the coordinates may include (but not limited to) the coordinates of the electronic pen on the drawing board or the handwriting board, the coordinates of the pen on the electronic whiteboard, the coordinates of the mouse pen on the The coordinates displayed on the computer screen, or the coordinates displayed by the mouse on the computer screen; the pressure level includes (but is not limited to) the pressure (level) collected by the sensor when drawing with the drawing board, or obtained in the program and related to the thickness of the line. Commands; colors include (but are not limited to) colors collected by sensors during drawing or commands representing colors, or commands obtained in a program that are related to colors.

431 In order to correctly process the handwriting feature data received by the terminal of the video conference participant to draw a graph similar to that of the sender on the soft drawing board and reduce the amount of transmitted data, the handwriting feature parameters need to be encoded.

[0055]

437 3.1、 Handwriting Feature Parameter Coding and Decoding Method 1

[0056]

441 The simplest way to encode the handwriting feature parameters is to directly encapsulate the coordinates, pressure levels and colors that make up the handwriting feature parameters into a handwriting feature data stream. The processing flow is shown in Figure 3.

444 For the convenience of processing, the data read into the input buffer each time is all the handwriting feature parameters of a stroke, that is, all the handwriting feature parameters from the moment when the pen is started to the moment when the pen is started, and the pressure level at any time during this period is not equal to 0.

448 The encoding process is shown as 300 in FIG. 3 .

449 At the beginning, the value of the count variable i is 1. Assuming that the number of read handwriting feature parameters is FrameLen, the detailed processing steps are as follows:

[0057]

454 Step 301, read data: read all the handwriting feature parameters of a stroke and put them into the input buffer;

[0058]

458 Step 302, output start code: in order to be able to judge that the data received at the beginning of the decoding is the handwriting feature parameter when the pen was just started, put the start code Start\_Code into the output at the beginning of the handwriting feature data stream of a stroke. in the cache;

[0059]

464 Step 303, output color: during one stroke, the color of the handwriting is unchanged, so only one color value needs to be put into the output buffer in the handwriting feature data stream of one stroke;

[0060]

469 Step 304, output coordinates and pressure level: read out the coordinates  $Z(i)$  and pressure level  $F(i)$  of the  $i$ -th handwriting feature parameter and put them into the output buffer;

[0061]

474 Step 305, add 1 to the counting variable:  $i=i+1$ ;

[0062]

478 Step 306, end judgment: if  $i < \text{FrameLen} + 1$ , go to step 304 to continue processing, otherwise, execute the following steps;

[0063]

483 Step 307, output end code: in order to be able to judge the end of the handwriting feature data stream during decoding, put the end code End\_Code behind all the data in the output buffer;

[0064]

488 Step 308: Output all the handwriting feature data streams from the start code Start\_Code and the end code End\_Code in the output buffer, and the encoding ends.

[0065]

493 After the remote client receives the handwriting feature data, the processing flow is 320 in FIG. 3 .

494 At the beginning of decoding, the value of the count variable  $i$  is 0, and the detailed steps of decoding are as follows:

[0066]

499 Step 321, read data: read all the handwriting feature data streams of one stroke and put them into the input

buffer;

[0067]

504 Step 322, remove the start code: remove the start code Start\_Code at the beginning of the handwriting feature data stream;

[0068]

509 Step 323, read the color: after removing the start code Start\_Code, the color C of the handwriting can be directly obtained;

[0069]

514 Step 324, read the coordinates and pressure level: read the coordinate Z(i) and pressure level F(i) of the i-th handwriting feature parameter;

[0070]

519 Step 325, end judgment: if End\_Code is equal to the combination Z(i)F(i) of the coordinate and pressure level just read out, it means that the code stream has been decoded, and then step 329 is executed, otherwise step 326 is executed;

[0071]

525 Step 326, construct handwriting feature parameters S(i):  $S(i) = \{Z(i), F(i), C\}$

[0072]

529 Step 327, output data: put the handwriting feature parameter S(i) into the output buffer;

[0073]

533 Step 328, add 1 to the count variable:  $i = i + 1$ ; and go to step 324 to continue execution.

[0074]

537 Step 329, output data: output all the handwriting feature parameters in the output buffer, and the decoding ends.

[0075]

542 3.2、 Handwriting feature parameter encoding and decoding method 2

[0076]

546 During a stroke, the sampling values of the two consecutive handwriting feature parameters not only do not change the color, but also usually have a small difference between the coordinates and the pressure level, so it only needs less bits to complete the handwriting feature parameters. coding.

549 At the beginning of encoding, the initialization parameters are  $i=0$ ,  $Z(0)=F(0)=0$ .

550 Each time the data read into the input buffer is all the handwriting feature parameters of a single stroke.

Assuming that the number of read handwriting feature parameters is FrameLen, the encoding process is shown as 400 in Figure 4:

[0077]

556 Step 401, read data: read all the handwriting feature parameters of a stroke and put them into the input buffer;

[0078]

560 Step 402, output start code: put the start code Start\_Code into the output buffer at the beginning of the handwriting characteristic data stream of a stroke;

[0079]

565 Step 403, output color: send the color value of the pen to the output buffer;

[0080]

569 Step 404, add 1 to the counting variable:  $i=1+i$ ;

[0081]

573 Step 405, increment calculation: read the coordinate  $Z(i)$  and pressure level  $F(i)$  of the  $i$ -th handwriting characteristic parameter, and calculate the coordinate increment and pressure level increment respectively, that is,

[0082]

579  $\Delta Z(i)=Z(i)-Z(i-1)$

[0083]

583  $\Delta F(i)=F(i)-F(i-1)$

[0084]

587 Step 406, incremental output: put  $\Delta Z(i)$  and  $\Delta F(i)$  into the output buffer.

[0085]

591 Step 407, end judgment: if  $i < \text{FrameLen} + 1$ , go to step 404 to continue processing, otherwise, execute the following steps;

[0086]

596 Step 408, output end code: put the end code `End_Code` behind all the data in the output buffer;

[0087]

600 Step 409, output data: output all the handwriting feature data streams from the start code `Start_Code` and the end code `End_Code` in the output buffer, and the encoding ends.

[0088]

605 At the beginning of decoding, the initialization parameters are  $i=0$ ,  $Z(0)=F(0)=0$ , the decoding process is 420 in the figure, and the detailed steps are as follows:

[0089]

610 Step 421, read data: read all the handwriting feature data streams of a stroke and put them into the input buffer;

[0090]

615 Step 422, remove the start code: remove the start code `Start_Code` at the beginning of the handwriting feature data stream;

[0091]

620 Step 423, read the color: directly obtain the color  $C$  of this handwriting after removing the start code `Start_Code`;

[0092]

625 Step 424, add 1 to the count variable:  $i=i+1$ ;

[0093]

629 Step 425, read increment: read the coordinate increment  $\Delta Z(i)$  and pressure level increment  $\Delta F(i)$  of the  $i$ -th handwriting characteristic parameter;

[0094]

634 Step 426, end judgment: if End\_Code is equal to the combination  $\Delta Z(i) \Delta F(i)$  of  $\Delta Z(i)$  and  $\Delta F(i)$  just read out, it means that the code stream has been decoded, and then step 430 is executed, otherwise, step 430 is executed. 427;

[0095]

640 Step 427: Calculate the coordinates and pressure level: Calculate the coordinates and pressure level according to the read coordinate increment and pressure level increment:

[0096]

645  $Z(i) = Z(i-1) + \Delta Z(i)$

[0097]

649  $F(i) = F(i-1) + \Delta F(i)$

[0098]

653 Step 428: Construct handwriting feature parameters  $S(i)$ :  $S(i) = \{Z(i), F(i), C\}$

[0099]

657 Step 429, output data: put the handwriting feature parameter  $S(i)$  into the output buffer, and go to step 424 to continue execution;

[0100]

662 Step 430, output data: output all the handwriting feature parameters in the output buffer, and the decoding ends.

[0101]

667 3.3、Handwriting feature parameter encoding and decoding method 3



[0102]

671 In order to further reduce the bit rate of the handwriting feature data stream, the lossless encoding algorithm is used to encode the combination  $\{\Delta Z(i) \Delta F(i)\}$  of the coordinate increment and the pressure level increment based on the incremental encoding in Section 2.2. can achieve this purpose.

674 The encoding process is shown as 500 in Figure 5. The object of lossless encoding is the combination of coordinate increment and pressure level increment  $\{\Delta Z(i) \Delta F(i)\}$ . The detailed encoding process is as follows:

[0103]

680 Step 501, read data: read all the handwriting feature parameters of a stroke and put them into the input buffer;

[0104]

684 Step 502, output start code: put the start code Start\_Code into the output buffer;

[0105]

688 Step 503, output color: send the color value of the pen to the output buffer;

[0106]

692 Step 504, output the DC component: put the coordinates and pressure level of the first handwriting feature parameter into the output buffer;

[0107]

697 Step 505, increment calculation and combination: read the coordinate  $Z(i)$  and pressure level  $F(i)$  of the  $i$ -th handwriting characteristic parameter, and calculate the coordinate increment and pressure level increment respectively, that is,

[0108]

703  $\Delta Z(i) = Z(i) - Z(i-1)$

[0109]

707 ,  $(2 \leq i \leq \text{FrameLen})$

[0110]

711  $\Delta F(i) = F(i) - F(i-1)$

[0111]

715 The incremental combination  $X(i)$  is  $X(i) = \{ \Delta Z(i), \Delta F(i) \}$ ;

[0112]

719 Step 506, lossless encoding: use a lossless encoding algorithm to encode the incremental combination  $X(i)$ ;

[0113]

723 Step 507, output code stream: put the code stream obtained through lossless encoding into the output buffer;

[0114]

727 Step 508, output end code: put the end code `End_Code` behind all the data in the output buffer;

[0115]

731 Step 509, output data: output all the handwriting feature data streams from the start code `Start_Code` and the end code `End_Code` in the output buffer, and the encoding ends

[0116]

736 The decoding process is shown as 520 in Figure 5, and the detailed steps are as follows:

[0117]

740 Step 521, read data: read all the handwriting feature data streams of one stroke and put them into the input buffer;

[0118]

745 Step 522, remove the start code: remove the start code `Start_Code` at the beginning of the handwriting feature data stream;

[0119]

750 Step 523, read the color: directly obtain the color  $C$  of this handwriting after removing the start code `Start_Code`;

[0120]

755 Step 524, read the DC component: read the coordinate  $Z(1)$  and the pressure level  $F(1)$  of the first sample of the handwriting characteristic parameter;

[0121]

760 Step 525, read code stream: read all lossless encoded code streams;

[0122]

764 Step 526, lossless decoding: decode the lossless encoded code stream;

[0123]

768 Step 527, data restoration: Calculate the coordinates and pressure levels according to the decoded coordinate increments, pressure level increments and mass components, and combine the handwriting feature parameters  $S(i)$ :

[0124]

774  $S(i) = \{Z(i), F(i), C\}$

[0125]

778 in

[0126]

782  $Z(i) = Z(i-1) + \Delta Z(i)$

[0127]

786 , ( $2 \leq i \leq \text{FrameLen}$ )

[0128]

790  $F(i) = F(i-1) + \Delta F(i)$

[0129]

794 Step 528, output data: output all the handwriting feature parameters in the output buffer, and the decoding ends.

[0130]

799 The lossless compression algorithm adopted in the present invention includes (but is not limited to) LZ77 encoding, LZMA encoding, LZW encoding, Huffman encoding, arithmetic encoding, ADPCM, exponential Golomb encoding, run-length encoding, DEFLATE encoding, and ABO encoding.

802 These algorithms are all classical algorithms and will not be discussed here.

[0131]

806 3.4. Handwriting feature parameter encoding and decoding method 4

[0132]

810 In general, encoding the individual objects in a composite object sequentially reduces the bitrate of the bitstream even further.

812 To this end, the encoding algorithm in Section 2.3 can be improved.

813 The encoding process of the improved algorithm is shown as 600 in Figure 6, and the detailed encoding process is as follows:

[0133]

818 Step 601, read data: read all the handwriting feature parameters of a stroke and put them into the input buffer;

[0134]

822 Step 602, output start code: put the start code Start\_Code into the output buffer;

[0135]

826 Step 603, output color: send the color value of the pen to the output buffer;

[0136]

830 Step 604, output the DC component: put the coordinates and pressure level of the first handwriting feature parameter into the output buffer;

[0137]

835 Step 605, component separation and increment calculation: read the coordinates  $Z(i)$  and pressure level  $F(i)$

of the remaining trace feature parameters, and calculate the coordinate increment series  $\{\Delta Z(i): 2 \leq i \leq \text{FrameLen}\}$  and pressure level increment series  $\{\Delta F(i): 2 \leq i \leq \text{FrameLen}\}$ ;

[0138]

847 Step 606, lossless encoding of coordinate increments: use a lossless encoding algorithm to encode coordinate increments  $\{\Delta Z(i): 2 \leq i \leq \text{FrameLen}\}$ ;

[0139]

848 Step 607, coordinate code stream output: put the coordinate code stream obtained through lossless encoding into the output buffer;

[0140]

851 Step 608, output end code: put the end code End\_Code into the output buffer;

[0141]

855 Step 609, lossless encoding of pressure level increments: perform lossless encoding on pressure level increments  $\{\Delta F(i): 2 \leq i \leq \text{FrameLen}\}$ ;

[0142]

860 Step 610, output the pressure level code stream: put the pressure level code stream into the output buffer;

[0143]

864 Step 611, output end code: put the end code End\_Code into the output buffer;

[0144]

868 Step 612, output data: output all the handwriting feature data streams in the output buffer, and end the encoding.

[0145]

873 The decoding process is shown as 620 in Figure 6, and the detailed steps are as follows:

[0146]

877 Step 621, read data: read all the handwriting feature data streams of a stroke and put them into the input

buffer;

[0147]

882 Step 622, remove the start code: remove the start code Start\_Code at the beginning of the handwriting feature data stream;

[0148]

887 Step 623, read the color: directly obtain the color C of this handwriting after removing the start code Start\_Code;

[0149]

892 Step 624, read the DC component: read the coordinate Z(1) and the pressure level F(1) of the first sample of the handwriting feature parameter;

[0150]

897 Step 625, read coordinate code stream: read all coordinate code streams;

[0151]

901 Step 626, lossless decoding: decode the coordinate code stream;

[0152]

906 Step 627, coordinate data restoration: calculate the coordinate series  $\{Z(i): 1 \leq i \leq \text{FrameLen}\}$  according to the decoded coordinate increment and the DC component of the coordinate;

[0153]

910 Step 628, read the pressure level code stream: read all pressure level code streams;

[0154]

914 Step 629, lossless decoding: decode the pressure-level code stream;

[0155]

918 Step 630, restore pressure level data: calculate the pressure level series  $\{F(i): 1 \leq i \leq \text{FrameLen}\}$  according to the pressure level increment obtained by decoding and the DC component of the pressure level;

[0156]

923 Step 631: Restoration and output of handwriting parameters: according to color C, coordinate series  $\{Z(i): 1 \leq i \leq \text{FrameLen}\}$ , pressure level series  $\{F(i): 1 \leq i \leq \text{FrameLen}\}$ , synthesize the handwriting feature parameter series  $\{S(i): 1 \leq i \leq \text{FrameLen}\}$  and output, and end decoding.

[0157]

929 3.5、Handwriting Feature Parameter Coding and Decoding Method 5

[0158]

933 In general, the acceleration amount is smaller than the incremental change. Therefore, taking the acceleration amount as the encoding object will further reduce the bit rate of the handwriting feature parameter code stream.

936 The encoding process is shown in Figure 7, which is an improvement of Embodiment 4. The detailed process is as follows:

[0159]

941 Step 701, read data: read all the handwriting feature parameters of a stroke and put them into the input buffer;

[0160]

945 Step 702, output start code: put the start code Start\_Code into the output buffer;

[0161]

949 Step 703, output color: send the color value of the pen to the output buffer;

[0162]

953 Step 704, calculation of increment and acceleration: respectively calculate the x-direction increment  $\{\Delta X(i)\}$  and acceleration  $\{\delta X(i)\}$  of the coordinates; the y-direction increment  $\{\Delta Y(i)\}$  and acceleration  $\{\delta Y(i)\}$ ; and the pressure level increment  $\{\Delta F(i)\}$  and acceleration  $\{\delta F(i)\}$ , calculated as follows:

[0163]

959  $\Delta X(i) = X(i) - X(i-1)$

[0164]

963  $\Delta Y(i) = Y(i) - Y(i-1)$ , ( $2 \leq i \leq \text{FrameLen}$ )

[0165]

967  $\Delta F(i) = F(i) - F(i-1)$

[0166]

971 in

[0167]

975  $\delta X(i) = \Delta X(i) - \Delta X(i-1)$

[0168]

979  $\delta Y(i) = \Delta Y(i) - \Delta Y(i-1)$ , ( $3 \leq i \leq \text{FrameLen}$ )

[0169]

983  $\delta F(i) = \Delta F(i) - \Delta F(i-1)$

[0170]

987 Step 705, output the DC component: put the coordinates and pressure level of the first handwriting feature parameter into the second coordinate increment ( $\Delta X(2)$ ,  $\Delta Y(2)$ ), the second pressure level increment  $\Delta F(2)$  in the output cache;

[0171]

993 Step 706, acceleration lossless encoding: use a lossless encoding algorithm to encode the acceleration volume series  $\{\delta X(i)\}$ ,  $\{\delta Y(i)\}$  and  $\{\delta F(i)\}$  respectively, to obtain the acceleration flow;

[0172]

998 Step 707, code stream output: according to the X, Y directions of the coordinates, and the pressure level sequence, put the code stream obtained through the lossless encoding into the output buffer, and separate them with the end code End\_Code;

[0173]



1004 Step 708, output data: output all the handwriting feature data streams in the output buffer, and end the encoding.

[0174]

1009 The decoding process is shown as 720 in Figure 7, and the detailed steps are as follows:

[0175]

1013 Step 721, read data: read all the handwriting feature data streams of a stroke and put them into the input buffer;

[0176]

1018 Step 722, remove the start code: remove the start code Start\_Code at the beginning of the handwriting feature data stream;

[0177]

1023 Step 723, read the color: directly obtain the color C of the handwriting after removing the start code Start\_Code;

[0178]

1028 Step 724, read the DC component: read the coordinate Z(1) and the pressure level F(1) of the first sample of the handwriting characteristic parameter;

[0179]

1033 Step 725, read the code stream: read out all the acceleration streams;

[0180]

1037 Step 726, lossless decoding: decode the read acceleration flow;

[0181]

1041 Step 727: Formation of handwriting feature parameters: Calculate the X-direction series {X(i)}, Y-direction series {Y(i)}, pressure and series {F(i)}; and combine the handwriting feature parameters S(i):

[0182]

1046  $S(i) = \{Z(i), F(i), C\}, (1 \leq i \leq \text{FrameLen})$

[0183]

1050 where  $Z(i) = \{X(i), Y(i)\}$ .

1051 and

[0184]

1055  $X(i) = X(i-1) + \Delta X(i)$

[0185]

1059  $Y(i) = Y(i-1) + \Delta Y(i), (2 \leq i \leq \text{FrameLen})$

[0186]

1063  $F(i) = F(i-1) + \Delta F(i)$

[0187]

1067 in

[0188]

1071  $\Delta X(i) = \Delta X(i-1) + \delta X(i)$

[0189]

1075  $\Delta Y(i) = \Delta Y(i-1) + \delta Y(i), (3 \leq i \leq \text{FrameLen})$

[0190]

1079  $\Delta F(i) = \Delta F(i-1) + \delta F(i)$

[0191]

1083 Step 728, output data: output all the handwriting feature parameters in the output buffer, and the decoding ends.

[0192]

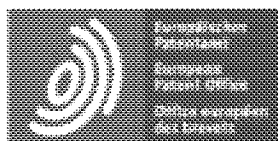
1088 4、 Content preservation

[0193]

1092 All content of the entire conference (including graphics on the softboard, oral comments, images and videos)  
are saved for future reference.

1094 In this way, the participants of the video communication can review the meeting in their free time.

1095 In addition, those who are unable to participate can view the video communication at a later time.



# Patent Translate

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## CLAIMS CN101729850A

1.

13 A video communication method based on handwriting feature data flow, the communication method involves two or more communication participants (wherein the terminal that sends video communication data, that is, the terminal that collects data is called the local end, and the video The terminal that communicates data is called the remote terminal), which is characterized in that the processing method of taking the handwriting characteristic parameters when forming the picture as the processing object is adopted. During the video communication, when it is detected that the user is writing, the local terminal immediately processes the data. , the steps are as follows:

20 A. Collect data: collect the handwriting feature parameters of local users when they write;

21 B. Graphic drawing: that is, according to the collected handwriting characteristic parameters, the corresponding graphics are drawn on the soft drawing board;

23 C. Data encoding: perform lossless encoding on the locally generated handwriting feature parameters, and process them into a handwriting feature data stream;

25 D. Data sending: send the locally generated handwriting feature data stream to the other remote terminals participating in this video communication through the network;

27 When the remote end receives the handwriting feature data stream, it immediately performs corresponding processing. The processing steps are as follows:

29 E. Data decoding: decode the received handwriting feature data stream to obtain handwriting feature parameters;

31 F. Data preprocessing: If the resolution of the display screen of the receiving data terminal is different from the resolution of the display screen of the sending data terminal, it is necessary to make corresponding adjustments to the decoded note feature parameters before drawing the graphics;

34 G. Graphic drawing: draw corresponding graphics on its own soft drawing board according to the note feature parameters.

2.

<sup>39</sup> The video communication method based on handwriting feature data stream as claimed in claim 1, characterized in that when the video communication starts, the soft artboards of all video communication participants are initialized first, that is, only backgrounds are presented on these soft artboards.

3.

<sup>45</sup> The video communication method based on handwriting feature data stream as claimed in claim 1, characterized in that the graph is incrementally drawn during the communication, that is, when the handwriting feature parameter is received, the graph of the added part is drawn, otherwise the graph will remain constant.

4.

<sup>52</sup> The video communication method based on handwriting feature data stream as claimed in claim 1, wherein the handwriting feature parameter is composed of three parameters: the coordinates of the point where the pen is touched, the pressure (level) of the pen at that time, and the color of the pen.

5.

<sup>58</sup> A video communication processing system based on handwriting feature data stream, the processing system involves two (or more than two) communication terminals (wherein the terminal that sends video communication data, that is, the terminal that collects data is called the local terminal, and the receiving terminal is called the local terminal. The terminal to the video communication data is called the remote terminal), and it is characterized in that all communication terminals include a data acquisition module, which is used to collect the handwriting characteristic parameters of the local user when writing; the data encoding module, which performs lossless on the handwriting characteristic parameters produced locally. encoding and processing them into handwriting feature data streams; data sending module, sending the locally generated handwriting feature data streams to the other remote ends participating in this video communication through the network; data receiving module, receiving the handwriting features from the remote end of the network Data stream; the data decoding module decodes the received handwriting feature data stream to obtain handwriting feature parameters; the data preprocessing module interprets the decoded notes according to the difference between its own display screen resolution and that of the sender's screen. The feature parameters are adjusted accordingly; the graphics drawing module draws the corresponding graphics on the soft drawing board according to the note feature parameters.

6.

<sup>76</sup> The video communication processing system based on the handwriting feature data stream as claimed in claim 5, wherein the graphic drawing module adopts incremental drawing, that is, when the handwriting feature parameters are received, the graphic of the added part is drawn, otherwise the graphic will be constant.

7.

*sz* The video communication processing system based on the handwriting feature data stream as claimed in claim 5, wherein the handwriting feature parameter is composed of three parameters: the coordinates of the point where the pen is touched, the pressure (level) of the pen at that time, and the color of the pen.

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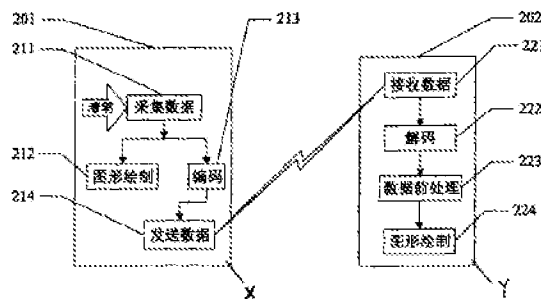
权利要求书 1 页 说明书 11 页 附图 10 页

### (54) 发明名称

基于笔迹特征数据流的视频通信方法及其处理系统

### (57) 摘要

本发明公开了一种基于笔迹特征数据流的视频通信方法。在视频通信的过程中,所有参与者以软画板为协作平台,他们在软画板上写字、绘画时的笔迹特征参数被迅速采集,编码成笔迹特征数据流并通过网络实时发送给远程客户端,远程终端立即对收到数据进行解码,根据接收端与发送端的显示屏分辨率的差异对解码出来的笔记特征参数作相应的调整,并绘制出相应的图形;远程参与者可以对图形进行修改和评述,他的意见也被发送给其余参与者。基于本发明技术方案的视频通信只需要极小的网络带宽就能保证会议期间画面清晰、流畅和声音清晰,极大地克服了现有技术的投资巨大、运营成本高、算法复杂、画面不清晰的缺点,同时能让参与者间达到深层次的沟通和交流。



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1. 一种基于笔迹特征数据流的视频通信方法,该通信方法涉及两方或者两方以上通信参与者(其中发送视频通信数据的终端,也即收集数据的终端被称为本地端,而收到视频通信数据的终端被称为远程端),其特征在于,采用了把形成画面时的笔迹特征参数作为处理对象的处理方式,在视频通信期间,当检测到用户着笔时,本地端立即进行处理数据,其步骤如下:

A、采集数据:收集本地用户着笔时的笔迹特征参数;

B、图形绘制:即根据采集到的笔迹特征参数在软画板上绘制出相应的图形;

C、数据编码:对本地产生的笔迹特征参数进行无损编码,把它们处理成笔迹特征数据流;

D、数据发送:通过网络把本地产生的笔迹特征数据流发送给其余参加本次视频通信的远程终端;

远程端接收到笔迹特征数据流时立即做出相应处理,处理步骤如下:

E、数据解码:对收到的笔迹特征数据流进行解码,以得到笔迹特征参数;

F、数据前处理:如果收到数据终端的显示屏的分辨率与发送数据终端的显示屏分辨率的不同,则在绘制图形前需要对解码出来的笔迹特征参数作相应的调整;

G、图形绘制:根据笔迹特征参数在自身的软画板上绘制出相应图形。

2. 如权利要求1所述的基于笔迹特征数据流的视频通信方法,其特征在于在视频通信开始时,首先要对所有视频通信参与者的软画板进行初始化,即这些软画板上只呈现背景。

3. 如权利要求1所述的基于笔迹特征数据流的视频通信方法,其特征在于在通信期间采用增量式绘制图形,即当收到笔迹特征参数时,才绘制增加部分的图形,否则图形将保持不变。

4. 如权利要求1所述的基于笔迹特征数据流的视频通信方法,其特征在于笔迹特征参数由着笔时着笔点的坐标、笔当时的压力(级)、笔的颜色三个参数组成。

5. 一种基于笔迹特征数据流的视频通信处理系统,该处理系统涉及两个(或者两个以上)通信终端(其中发送视频通信数据的终端,也即收集数据的终端被称为本地端,而收到视频通信数据的终端被称为远程端),其特征在于所有通信终端均包含采集数据模块,用于收集本地用户着笔时的笔迹特征参数;数据编码模块,对本地产生的笔迹特征参数进行无损编码,把它们处理成笔迹特征数据流;数据发送模块,通过网络把本地产生的笔迹特征数据流发送给其余参加本次视频通信的远程端;数据接收模块,接收网络远程端传来的笔迹特征数据流;数据解码模块,对收到的笔迹特征数据流进行解码,以得到笔迹特征参数;数据前处理模块,根据本身的显示屏分辨率与发送端的显示屏分辨率的差异对解码出来的笔迹特征参数作相应的调整;图形绘制模块,根据笔迹特征参数在软画板上绘制出相应图形。

6. 如权利要求5所述的基于笔迹特征数据流的视频通信处理系统,其特征在于图形绘制模块采用增量式绘制图形,即当收到笔迹特征参数时,才绘制增加部分的图形,否则图形将保持不变。

7. 如权利要求5所述的基于笔迹特征数据流的视频通信处理系统,其特征在于笔迹特征参数由着笔时着笔点的坐标、笔当时的压力(级)、笔的颜色三个参数组成。



## 基于笔迹特征数据流的视频通信方法及其处理系统

### 技术领域

[0001] 本发明涉及一种基于笔迹特征数据流的视频通信方法及其处理系统,具体地说,本发明涉及一种在网络环境中把在软画板上形成画面的笔迹特征参数作为视频处理对象的视频通信方法及其处理系统。

### 背景技术

[0002] 各种会议占据企业员工很多工作时间,同时也花费企业很高的成本。如何有效地利用会议时间和节约会议期间来往的费用被企业作为增加生产力和节约成本方面的有效手段而越来越重视。

[0003] 每个企业都需要信息和意见的自由交流以改善他们的产品和服务。团队里和团队外的人员之间的有效沟通和协作可以提高产品的质量、提升产品或项目开发的研发周期并减少成本。然而,快速有效地沟通通常是很难实现的,特别是在跨国企业。而阻碍快速有效沟通的一个关键因素通常是人们在不同的地域上。通常,人们为了参加一两个小时的会议可能会花费大笔费用和几天的时间在旅途上,特别是当召开跨国界或跨大陆会议时,该问题就更加突出。

[0004] 为此,人们迫切地需要一种方式来使得在召开会议时不在同一地域上的相关人都能够轻松容易地实时参加会议、发表个人意见并分享他人的意见。这就是视频会议系统。现在的视频会议系统可以分为软终端和硬终端两种。虽然基于硬终端的视频会议系统提供的视频会议的画面清晰、流畅,但是这种系统不光硬件设备昂贵,而且在开会时需要占用很大的带宽,要为此付出高昂的通讯费,并且基本上基于 LAN 和 ATM 网络。这就限制了这种会议系统的广泛应用。而基于 Internet 的软终端视频会议系统是以摄像头和麦克风为视频和音频输入的设备,传送一路分辨率为 CIF 的视频和音频通常需要占用 400Kbps 以上的带宽。在 Internet 网中处处满足这样的带宽是很困难的,而很多这类视频会议产品同时传送几路视频,甚至十几路视频,更不用说跨国界或跨大陆的视频会议了。当然,一些公司试图引入某种技术,以降低视频会议带宽的需求,如:专利号为 CN1525300A,“用于实时白板流技术的系统和方法”;专利号为 CN1555197A,“基于 Internet 的视频会议共享白板的实现方法”;专利号为 CN101005600A,“使用白板的会议系统”等等。但是,这些方法都没有从本质上解决视频会议对带宽的需求。

[0005] 网络技术的成熟为网络教育发展提供了技术基础。目前,世界各地区和国家均不同程度地关注和介入虚拟大学和网上教学模式,但发展极不均衡。世界上有几百所大学提供网络教学课程。这些提供网络教学课程的大学中有 52.6% 在北美,23.9% 在欧洲,大洋洲为 10.6%,亚洲 7.5%,拉丁美洲和加勒比海为 4.8%,非洲为 0.6%。造成这种现象的一个关键原因是现在的网络教育依托在很大的网络带宽之上,而全球的网络资源主要分布在北美洲。

[0006] 还有,在现在视频会议或者网络课堂中,会议参与者或者网络课堂参与者很不方便(或者根本不能)对显示在用户窗口中的图形进行修改以反馈他们的不同意见,这极度

地限制了所有会议参与者或者课堂参与者的深入交流和沟通。

## 发明内容

[0007] 为了克服现有视频通信技术的不足,尽可能降低视频通信对网络带宽的需求,并保证视频会议期间画面清晰、流畅和声音清晰,本发明抛弃了在传统的视频通信技术中把画面作为处理对象的处理方式,而采用了把形成画面时的笔迹特征参数作为处理对象的处理方式。在通信的过程中,所有视频通信参与者以软画板为协作平台,通过在软画板上写字、画图,或者是画画来表达他们各自的观点和意见,以达到深层次的讨论和交流;并且,只需要极小的网络就能保证视频会议期间画面清晰、流畅和声音清晰。

[0008] 为了实现上述这一目的,本发明的技术方案如下:一种基于笔迹特征数据流的视频通信方法,该通信方法涉及两方或者两方以上通信参与者(为了讨论方便,在本发明中把发送视频通信数据的终端(即产生数据端)称为本地端,而把收到视频通信数据的终端称为远程端),在视频通信开始时,首先要对所有视频通信参与者的终端上软画板上进行初始化,即这些终端的软画板上只呈现背景。本发明中所述的软画板是指用户窗口(也称为用户界面、显示窗口),属于软件。当本地端检测到用户着笔时,本地端立即进行处理数据,其步骤如下:

[0009] A、采集数据:收集本地用户着笔时的笔迹特征参数;

[0010] B、图形绘制:即根据采集到的笔迹特征参数在软画板上绘制出相应的图形;

[0011] C、数据编码:对本地产生的笔迹特征参数进行无损编码,把它们处理成笔迹特征数据流;

[0012] D、数据发送:通过网络把本地产生的笔迹特征数据流发送给其余参加本次视频通信的远程终端。

[0013] 远程端接收到笔迹特征数据流时,立即做出相应处理,处理步骤如下:

[0014] E、数据解码:对收到的笔迹特征数据流进行解码,以得到笔迹特征参数;

[0015] F、数据前处理:如果收到数据终端的显示屏的分辨率与发送数据终端的显示屏分辨率有所不同,则在绘制图形前需要对解码出来的笔记特征参数作相应的调整;

[0016] G、图形绘制:根据笔记特征参数在自身的软画板上绘制出相应图形。

[0017] 如果某一远程参与者有不同的意见,他可以对软画板上显示的画面进行修改,那么他的通信设备就成了本地端,其余视频通信参与者的终端就成远程端,返回步骤A。

[0018] 同在普通的画板上绘画一样,在通信期间软画板上的图形随着笔迹特征参数的增多而丰富,即本发明采用增量式绘制图形——当收到笔迹特征参数时,图形才增加相应的部分,否则图形将保持不变。从上面叙述可知,在本发明中本地端与远程端是相对的,本地端在视频通信过程中产生数据,它不但需要根据本地产生的笔迹特征参数绘制图形,而且需要把笔迹特征参数编码成笔迹特征数据流,实时发送出去;远程端则对收到的笔迹特征数据流立即进行解码,如果它的显示屏的分辨率与发送端(即本地端)的显示屏分辨率有所不同,则需要对解码出来的笔迹特征参数做相应的调整,并绘制出相应部分的图形;如果远程端对显示在软画板上的图形进行修改,那么它就变成本地端,原来的本地端就成为了远程端。

[0019] 本发明的另一目的在于提供一种基于笔迹特征数据流的视频通信处理系统,采用

该处理系统的视频通信只需要极小的网络带宽就能保证视频会议期间画面清晰、流畅和声音清晰。

[0020] 为了实现这一目的,本发明的技术方案如下:一种基于笔迹特征数据流的视频通信处理系统,该处理系统涉及两个(或者两个以上)通信终端,其特征在于所有通信终端均包含采集数据模块,用于收集本地用户着笔时的笔迹特征参数;数据编码模块,对本地产生的笔迹特征参数进行无损编码,把它们处理成笔迹特征数据流;数据发送模块,通过网络把本地产生的笔迹特征数据流发送给其余参加本次视频通信的远程终端;数据接收模块,接收网络远端传来的笔迹特征数据流;数据解码模块,对收到的笔迹特征数据流进行解码,以得到笔迹特征参数;数据前处理模块,根据本身的显示屏分辨率与发送端的显示屏分辨率的差异对解码出来的笔迹特征参数作相应的调整;图形绘制模块,根据笔迹特征参数在软画板上绘制出相应图形。

[0021] 上述的笔迹特征参数由着笔时着笔点的坐标、笔当时的压力(级)、笔的颜色等三个参数组成。在不引起混淆的情况下,这三个参数将分别简称为坐标、压力级、颜色。坐标表示在画图时笔尖在画面中的一具体位置;压力级表示在画图时施加给笔尖的压力,在画面上呈现出来的是笔迹的粗细程度或墨迹的浓度,或线条的宽度;颜色就是画图过程中所采用的颜色。本发明把这三个参数(着笔点的坐标、笔当时的压力(级)、笔的颜色)的组合定义为笔迹特征参数,即本发明所说的处理对象。在通信的过程中,实时采集笔迹特征参数的三个组成成分,并对采集到的笔迹特征参数进行实时编码,即处理成笔迹特征数据流,通过网络把笔迹特征数据流传送给远程客户端。远程客户端立即对收到笔迹特征数据流进行解码以得到与发送端相同的笔迹特征参数,远程客户端根据自身的显示屏分辨率与发送端的不同对笔迹特征参数(坐标、压力级、颜色)相应调整后就能绘制出与发送端相似的图形。由于组成笔迹特征参数的三个成分(坐标、压力级、颜色)只要有一点差别,绘制出来的图形就有很大的不同,所以在对笔迹特征参数进行编码时采用的是无损编码方式,即编码前的数据与解码后的数据是完全相同的。

[0022] 如本发明所述的方法具有许多优点:1)它公开了一种把形成画面时的笔迹作为处理对象的,非常具有前景的数据处理方式,这种处理方式使视频通信的数据量极大地减小,从而大大降低了视频会议或者网络课堂对带宽的要求,节约了企业或教育机构的运营成本;2)同时,这种处理方式使所有与会者都能够像在同一个会议室开会一样,方便了参与者的深入沟通和交流;3)这种处理方式也克服了传统视频会议或者网络课堂的参与者只能听和发表评论、却不能对窗口中的内容进行修改(比如传统硬件会议系统)或者对窗口中内容修改不方便、不准确(比如纯软件会议系统)的不足,也使视频会议系统或网络课堂系统的广泛应用成为可能,同时也节约了人力成本、方便了学员;4)实现本发明的算法的复杂度非常低,这使得处理器性能比较低便携产品(如智能手机)就可以成为本发明的视频通信终端设备。

[0023] 除了上述的优点之外,本发明的其它优点可以从下面结合附图的具体描述中进一步体现出来。

#### 附图说明

[0024] 图1是基于笔迹特征数据流的视频通信方法及系统的典型通信系统图。

[0025] 图 2 是基于笔迹特征数据流的视频通信方法及系统的视频通信时处理笔迹特征参数的过程图。

[0026] 图 3a 和图 3b 是采用直接方式对笔迹特征参数编码、解码的流程图。

[0027] 图 4a 和图 4b 是采用差值方式对笔迹特征参数编码、解码的流程图。

[0028] 图 5a 和图 5b 是以坐标增量和压力级增量的组合为无损编码的编码对象的编码、解码流程。

[0029] 图 6a 和图 6b 是分别以坐标增量和压力级增量为无损编码的编码对象的编码、解码流程。

[0030] 图 7a 和图 7b 是以加速度量为无损编码的编码对象的编码、解码流程。

### 具体实施方式

[0031] 在本发明的较佳实施例的下述描述中,参考了作为说明书一部分的附图进行描述,所述附图说明了本发明可以采用的特定实施例。本领域技术人员应该理解在不背离本发明精神的情况下,还可以使用其它实施例或对这些实施例进行修改。这都没有超出本发明的公开范围。

[0032] 1、示范工作环境

[0033] 一种基于笔迹特征数据流的视频通信方法及系统通常具有基于网络环境中服务器和多个安排在基于网络的环境中的客户终端。客户终端可以是(但不局限于)个人计算机、服务器计算机、手提或膝上型设备、多处理器系统、基于微处理器的系统、机顶盒、智能手机、平板 PC、网络 PC、微型计算机、大型机、包含上述任意系统和设备的分布式计算环境。这些客户终端中,有些终端只有基本的配置,它们只能播放音频、视频和录音。另一些则配备高级的设备,如投影仪、坐标检测仪等,坐标检测仪包括(但不局限于)电子画板、电子白板、鼠标笔等。在参加视频会议或者网络课堂时,用户利用坐标检测仪在软画板上画图的笔迹特征参数被收集并处理成笔迹特征数据流。这些笔迹特征数据流通过网络实时地发送给了服务器,服务器把接收到的数据转发给远程的视频会议或者网络课堂的参与者的客户终端(如 PC、智能手机等),而他们的也可以利用坐标检测仪对软画板上的内容进行修改,他们所添加的部分也被处理成笔迹特征数据流也以同样的方式发送回来以及其于远程参与者的客户终端,同时在会议或者课堂的进程中他们可以进行口头表达意见,这些口头意见被音频采集设备采集并压缩编码成音频流,以相同或者相似的方式发送给其他参与者的终端。

[0034] 这种系统的典型方案包括公司的视频会议和教育机构所开设的网络课堂(为了讨论方便,将以视频会议为例进行阐述)。如图 1 所示,该视频会议涉及到在聚集在 A 地会议室 101 的 L 个人,和聚集在 B 地会议室 102 的 N 个人,以及 M 个分散的远程用户 104a ~ 104m。聚集在会议室 101 中的 L 个人配备有电子画板(属于输入设备)111、捕获会议音频的麦克风设备 112、投影仪 115、个人电脑 114,以及安装在麦克风设备上的扬声器 113,以及将个人计算机 114 连接到在 Internet 网络环境中的服务器 100 的网络连接 103。聚集在会议室 102 里的 N 个人的配备与聚集在会议室 101 中的 L 个人的配备相似,只是配备的坐标检测仪是电子白板而不是电子画板。分布在其他地方的 M 个视频会议参与者可以在办公室里,家里,还可能在商务旅途中。他们配备了个人终端(如个人 PC、笔记本电脑、智能手机等



等)、带麦克风的耳机,坐标检测仪(如画板、鼠标笔等等),以及能够连接服务器 100 的网络连接。所有参加会议的人利用软画板作为协作空间,通过利用坐标检测仪在软画板上写字、画图来共享他们的意见。

[0035] 2、基于笔迹特征数据流的视频通信方法。

[0036] 如图 2 所示,当视频会议参与者 X 利用坐标检测仪在软画板上写字画图时(即着笔),本地端立即进行处理数据,其步骤如下:

[0037] 步骤 211,采集数据:收集本地用户着笔时的笔迹特征参数;

[0038] 步骤 212,图形绘制:即根据采集到的笔迹特征参数在软画板上绘制出相应的图形;

[0039] 步骤 213,数据编码:对本地产生的笔迹特征参数进行无损编码,把它们处理成笔迹特征数据流;

[0040] 步骤 214,数据发送:通过网络把本地产生的笔迹特征数据流发送给其余参加本次视频通信的远程终端。

[0041] 另一视频会议参与者 Y 位于网络远程终端,远程端接收到笔迹特征数据流时(221),立即做出相应处理,处理步骤如下:

[0042] 步骤 222,数据解码,对收到的笔迹特征数据流进行解码,以得到笔迹特征参数;

[0043] 步骤 223,数据前处理,如果收到数据终端的显示屏的分辨率与发送数据终端的显示屏分辨率的不同,则在绘制图形前需要对解码出来的笔记特征参数作相应的调整;

[0044] 步骤 224,图形绘制,根据笔记特征参数在自身的软画板上绘制出相应图形。

[0045] 如果某一远程通信参与者有不同的意见,他可以对软画板上显示的画面进行修改,那么他的通信设备就成了本地端,其余视频通信参与者的终端就成远程端,返回步骤 211。

[0046] 当然,不同的人对软画板上的图形进行修改时最好采用不同的颜色,以便于提醒所有视频会议或者网络课堂参与者有新的内容正在或者已经输入到画板上。

[0047] 在视频通信期间,他们说的话被录音设备采集,编码成音频流也被发送给远程的会议参与者的终端。远程客户终端接收到音频流后调用相应的音频解码器进行解码成音频数据,通过耳机、扬声器播放出来。

[0048] 3. 笔迹数据的处理方式

[0049] 当客户在软画板上写字画图时,笔迹特征参数的取得方式是:坐标可以包括(但不局限于)电子笔在画图板或手写板上的坐标、笔在电子白板上的坐标、鼠标笔在计算机屏幕显示的坐标、或者鼠标在计算机屏幕显示的坐标;压力级包括(但不局限于)利用画图板画图时传感器采集到的压力(级),或者在程序中取得的、与线条粗细相关的命令;颜色包括(但不局限于)画图时传感器采集到的颜色或代表颜色的命令,或者在程序中取得的、与颜色相关的命令。为了使视频会议参与者的终端接收到笔迹特征数据能够正确处理以在软画板上绘制出与发送端相似的图形,同时减小传送的数据量,需要对笔迹特征参数进行编码处理。

[0050] 3.1、笔迹特征参数编码、解码方法 1

[0051] 对笔迹特征参数编码的最简单一种方式就是把组成笔迹特征参数的坐标、压力级和颜色直接封装成笔迹特征数据流,处理流程如图 3 所示。为了处理方便,每次读入输入缓

存的数据是一笔的所有笔迹特征参数,即刚着笔瞬间到起笔瞬间的所有笔迹特征参数,在这期间任何时刻的压力级都不等于 0。编码过程如图 3 中 300 所示。在开始时,计数变量  $i$  值为 1,假设读入笔迹特征参数的个数是  $FrameLen$ ,详细地处理步骤如下:

[0052] 步骤 301,读取数据:读取一笔的所有笔迹特征参数放入输入缓存;

[0053] 步骤 302,输出起始码:为了在解码开始时能够判断收到的数据是开头的数据就是刚着笔时的笔迹特征参数,在一笔的笔迹特征数据流的开头把起始码  $Start\_Code$  放入输出缓存中;

[0054] 步骤 303,输出颜色:在一次着笔期间,笔迹颜色是不变的,所以一笔的笔迹特征数据流里只需要放入一次颜色值到输出缓存;

[0055] 步骤 304,输出坐标和压力级:把这笔第  $i$  笔迹特征参数的坐标  $Z(i)$  和压力级  $F(i)$  读出来放入输出缓存中;

[0056] 步骤 305,计数变量加 1:  $i = i + 1$ ;

[0057] 步骤 306,结束判断:如果  $i < FrameLen + 1$ ,则转到步骤 304 继续处理,否则执行下面的步骤;

[0058] 步骤 307,输出结束码:为了在解码时能够判断这次笔迹特征数据流结束,把结束码  $End\_Code$  放到输出缓存中所有数据的后面;

[0059] 步骤 308,把输出缓存中从起始码  $Start\_Code$  和结束码  $End\_Code$  的所有笔迹特征数据流输出,编码结束。

[0060] 当远程客户端接收到笔迹特征数据后,处理流程如图 3 中 320。在解码开始时,计数变量  $i$  值为 0,解码的详细步骤如下:

[0061] 步骤 321,读取数据:读取一笔的所有笔迹特征数据流放入输入缓存;

[0062] 步骤 322,去掉起始码:去掉笔迹特征数据流开头的起始码  $Start\_Code$ ;

[0063] 步骤 323,读取颜色:去掉起始码  $Start\_Code$  后可以直接取得这笔笔迹的颜色  $C$ ;

[0064] 步骤 324,读取坐标和压力级:读取这笔第  $i$  笔迹特征参数的坐标  $Z(i)$  和压力级  $F(i)$ ;

[0065] 步骤 325,结束判断:如果  $End\_Code$  等于刚读出来坐标与压力级的组合  $Z(i)F(i)$ ,则表明码流已经被解码完,接下来执行步骤 329,否则执行步骤 326;

[0066] 步骤 326,构造笔迹特征参数  $S(i)$ :  $S(i) = [Z(i), F(i), C]$

[0067] 步骤 327,输出数据:把笔迹特征参数  $S(i)$  放入输出缓存中;

[0068] 步骤 328,计数变量加 1:  $i = i + 1$ ;并转到步骤 324 继续执行。

[0069] 步骤 329,输出数据:把输出缓存中的所有笔迹特征参数输出,解码结束。

[0070] 3.2、笔迹特征参数编码、解码方法 2

[0071] 在一次着笔期间,连续的前后两个笔迹特征参数的采样值不但颜色不改变,而且坐标和压力级之间通常也相差很小,所以只需要更少的比特数就可以完成对笔迹特征参数的编码。在编码之初,初始化参数为  $i = 0$ ,  $Z(0) = F(0) = 0$ 。每次也是读入输入缓存的数据是一笔的所有笔迹特征参数,假设读入笔迹特征参数的个数是  $FrameLen$ ,其编码流程如图 4 中的 400 所示:

[0072] 步骤 401,读取数据:读取一笔的所有笔迹特征参数放入输入缓存;

[0073] 步骤 402,输出起始码:在一笔的笔迹特征数据流的开头把起始码  $Start\_Code$  放

入输出缓存中；

[0074] 步骤 403, 输出颜色 : 把这着笔的颜色值到输出缓存；

[0075] 步骤 404, 计数变量加 1 :  $i = i + 1$ ；

[0076] 步骤 405, 增量计算 : 读取第  $i$  笔迹特征参数的坐标  $Z(i)$  和压力级  $F(i)$ , 分别计算出坐标增量和压力级增量, 即

[0077]  $\Delta Z(i) = Z(i) - Z(i-1)$

[0078]  $\Delta F(i) = F(i) - F(i-1)$

[0079] 步骤 406, 增量输出 : 把  $\Delta Z(i)$  和  $\Delta F(i)$  放入输出缓存中。

[0080] 步骤 407, 结束判断 : 如果  $i < \text{FrameLen} + 1$ , 则转到步骤 404 继续处理, 否则执行下面的步骤；

[0081] 步骤 408, 输出结束码 : 把结束码  $\text{End\_Code}$  放到输出缓存中所有数据的后面；

[0082] 步骤 409, 输出数据 : 把输出缓存中从起始码  $\text{Start\_Code}$  和结束码  $\text{End\_Code}$  的所有笔迹特征数据流输出, 编码结束。

[0083] 在解码之初, 初始化参数为  $i = 0, Z(0) = F(0) = 0$ , 解码流程如图中 420, 详细步骤如下：

[0084] 步骤 421, 读取数据 : 读取一笔的所有笔迹特征数据流放入输入缓存；

[0085] 步骤 422, 去掉起始码 : 去掉笔迹特征数据流开头的起始码  $\text{Start\_Code}$ ；

[0086] 步骤 423, 读取颜色 : 去掉起始码  $\text{Start\_Code}$  后直接取得这笔笔迹的颜色  $C$ ；

[0087] 步骤 424, 计数变量加 1 :  $i = i + 1$ ；

[0088] 步骤 425, 读取增量 : 读取第  $i$  笔迹特征参数的坐标增量  $\Delta Z(i)$  和压力级增量  $\Delta F(i)$ ；

[0089] 步骤 426, 结束判断 : 如果  $\text{End\_Code}$  等于刚读出来  $\Delta Z(i)$  与  $\Delta F(i)$  的组合  $\Delta Z(i) \Delta F(i)$ , 则表明码流已经被解码完, 接下来执行步骤 430, 否则执行步骤 427；

[0090] 步骤 427, 计算坐标和压力级 : 根据读出来的坐标增量和压力级增量计算出坐标和压力级：

[0091]  $Z(i) = Z(i-1) + \Delta Z(i)$

[0092]  $F(i) = F(i-1) + \Delta F(i)$

[0093] 步骤 428, 构造笔迹特征参数  $S(i)$  :  $S(i) = \{Z(i), F(i), C\}$

[0094] 步骤 429, 输出数据 : 把笔迹特征参数  $S(i)$  放入输出缓存中, 并转到步骤 424 继续执行；

[0095] 步骤 430, 输出数据 : 把输出缓存中的所有笔迹特征参数输出, 解码结束。

[0096] 3.3、笔迹特征参数编码、解码方法 3

[0097] 为了进一步减小笔迹特征数据流的比特率, 在 2.2 节的增量编码的基础上采用无损编码算法对坐标增量与压力级增量的组合  $\{\Delta Z(i) \Delta F(i)\}$  进行编码就可以达到这个目的。编码流程如图 5 中 500 所示, 无损编码的对象是坐标增量与压力级增量的组合  $\{\Delta Z(i) \Delta F(i)\}$ , 详细编码流程如下：

[0098] 步骤 501, 读取数据 : 读取一笔的所有笔迹特征参数放入输入缓存；

[0099] 步骤 502, 输出起始码 : 把起始码  $\text{Start\_Code}$  放入输出缓存中；

[0100] 步骤 503, 输出颜色 : 把这着笔的颜色值到输出缓存；

[0101] 步骤 504, 输出直流分量: 把第 1 个笔迹特征参数的坐标和压力级放入输出缓存中;

[0102] 步骤 505, 增量计算及组合: 读取第  $i$  笔迹特征参数的坐标  $Z(i)$  和压力级  $F(i)$ , 分别计算出坐标增量和压力级增量, 即

[0103]  $\Delta Z(i) = Z(i) - Z(i-1)$

[0104] ,  $(2 \leq i \leq \text{FrameLen})$

[0105]  $\Delta F(i) = F(i) - F(i-1)$

[0106] 增量组合  $X(i)$  是  $X(i) = [\Delta Z(i), \Delta F(i)]$ ;

[0107] 步骤 506, 无损编码: 采用无损编码算法对增量组合  $X(i)$  进行编码;

[0108] 步骤 507, 输出码流: 把经过无损编码得到的码流放到输出缓存中;

[0109] 步骤 508, 输出结束码: 把结束码  $\text{End\_Code}$  放到输出缓存中所有数据的后面;

[0110] 步骤 509, 输出数据: 把输出缓存中从起始码  $\text{Start\_Code}$  和结束码  $\text{End\_Code}$  的所有笔迹特征数据流输出, 编码结束

[0111] 解码流程如图 5 中 520 所示, 详细步骤如下:

[0112] 步骤 521, 读取数据: 读取一笔的所有笔迹特征数据流放入输入缓存;

[0113] 步骤 522, 去掉起始码: 去掉笔迹特征数据流开头的起始码  $\text{Start\_Code}$ ;

[0114] 步骤 523, 读取颜色: 去掉起始码  $\text{Start\_Code}$  后直接取得这笔笔迹的颜色  $C$ ;

[0115] 步骤 524, 读取直流分量: 读取笔迹特征参数的第 1 个采样的坐标  $Z(1)$  和压力级  $F(1)$ ;

[0116] 步骤 525, 读取码流: 读取所有无损编码码流;

[0117] 步骤 526, 无损解码: 对无损编码的码流进行解码;

[0118] 步骤 527, 数据复原: 根据解码得到的坐标增量和压力级增量和质量分量计算出坐标和压力级, 并组合出笔迹特征参数  $S(i)$ ;

[0119]  $S(i) = \{Z(i), F(i), C\}$

[0120] 其中

[0121]  $Z(i) = Z(i-1) + \Delta Z(i)$

[0122] ,  $(2 \leq i \leq \text{FrameLen})$

[0123]  $F(i) = F(i-1) + \Delta F(i)$

[0124] 步骤 528, 输出数据: 把输出缓存中的所有笔迹特征参数输出, 解码结束。

[0125] 本发明中采用的无损压缩算法包括 (但不限于) LZ77 编码、LZMA 编码、LZW 编码、哈夫曼编码、算术编码、ADPCM、指数哥伦布编码、游程编码、DEFLATE 编码、ABO 编码。这些算法都是经典算法, 这里不再讨论。

[0126] 3.4、笔迹特征参数编码、解码方法 4

[0127] 通常情况下, 按顺序对复合对象中单个对象进行编码会更进一步降低码流的比特率。为此, 可以对在 2.3 节的编码算法进行改进。改进的算法的编码流程如图 6 中 600 所示, 详细编码流程如下:

[0128] 步骤 601, 读取数据: 读取一笔的所有笔迹特征参数放入输入缓存;

[0129] 步骤 602, 输出起始码: 把起始码  $\text{Start\_Code}$  放入输出缓存中;

[0130] 步骤 603, 输出颜色: 把这着笔的颜色值到输出缓存;



- [0131] 步骤 604, 输出直流分量: 把第 1 个笔迹特征参数的坐标和压力级放入输出缓存中;
- [0132] 步骤 605, 成份分离及增量计算: 读取剩余的迹特征参数的坐标  $Z(i)$  和压力级  $F(i)$ , 分别计算出坐标增量系列  $\{\Delta Z(i); 2 \leq i \leq \text{FrameLen}\}$  和压力级增量系列  $\{\Delta F(i); 2 \leq i \leq \text{FrameLen}\}$ ;
- [0133] 步骤 606, 坐标增量无损编码: 采用无损编码算法对坐标增量  $\{\Delta Z(i); 2 \leq i \leq \text{FrameLen}\}$  进行编码;
- [0134] 步骤 607, 坐标码流输出: 把经过无损编码得到的坐标码流放到输出缓存中;
- [0135] 步骤 608, 输出结束码: 把结束码  $\text{End\_Code}$  放到输出缓存中;
- [0136] 步骤 609, 压力级增量无损编码: 对压力级增量  $\{\Delta F(i); 2 \leq i \leq \text{FrameLen}\}$  进行无损编码;
- [0137] 步骤 610, 压力级码流输出: 把压力级码流放到输出缓存中;
- [0138] 步骤 611, 输出结束码: 把结束码  $\text{End\_Code}$  放到输出缓存中;
- [0139] 步骤 612, 输出数据: 把输出缓存中的所有笔迹特征数据流输出, 结束编码。
- [0140] 解码流程如图 6 中 620 所示, 详细步骤如下:
- [0141] 步骤 621, 读取数据: 读取一笔的所有笔迹特征数据流放入输入缓存;
- [0142] 步骤 622, 去掉起始码: 去掉笔迹特征数据流开头的起始码  $\text{Start\_Code}$ ;
- [0143] 步骤 623, 读取颜色: 去掉起始码  $\text{Start\_Code}$  后直接取得这笔笔迹的颜色  $C$ ;
- [0144] 步骤 624, 读取直流分量: 读取笔迹特征参数的第 1 个采样的坐标  $Z(1)$  和压力级  $F(1)$ ;
- [0145] 步骤 625, 读取坐标码流: 读取所有坐标码流;
- [0146] 步骤 626, 无损解码: 对坐标码流进行解码;
- [0147] 步骤 627, 坐标数据复原: 根据解码得到的坐标增量和坐标的直流分量计算出坐标系列  $\{Z(i); 1 \leq i \leq \text{FrameLen}\}$ ;
- [0148] 步骤 628, 读取压力级码流: 读取所有压力级码流;
- [0149] 步骤 629, 无损解码: 对压力级码流进行解码;
- [0150] 步骤 630, 压力级数据复原: 根据解码得到的压力级增量和压力级的直流分量计算出压力级系列  $\{F(i); 1 \leq i \leq \text{FrameLen}\}$ ;
- [0151] 步骤 631, 笔迹参数复原及输出: 根据颜色  $C$ 、坐标系列  $\{Z(i); 1 \leq i \leq \text{FrameLen}\}$ 、压力级系列  $\{F(i); 1 \leq i \leq \text{FrameLen}\}$  合成笔迹特征参数系列  $\{S(i); 1 \leq i \leq \text{FrameLen}\}$  并输出, 结束解码。
- [0152] 3.5、笔迹特征参数编码、解码方法 5
- [0153] 通常情况下加速度量比增量变化更小, 为此, 以加速度量为编码对象将更加降低笔迹特征参数码流的比特率。其编码流程如图 7 所示, 是实施例 4 的改进, 详细过程如下:
- [0154] 步骤 701, 读取数据: 读取一笔的所有笔迹特征参数放入输入缓存;
- [0155] 步骤 702, 输出起始码: 把起始码  $\text{Start\_Code}$  放入输出缓存中;
- [0156] 步骤 703, 输出颜色: 把这着笔的颜色值到输出缓存;
- [0157] 步骤 704, 增量和加速度量的计算: 分别计算出坐标的  $x$  方向增量  $\{\Delta X(i)\}$  和加速度量  $\{\delta X(i)\}$ ;  $y$  方向的增量  $\{\Delta Y(i)\}$  和加速度量  $\{\delta Y(i)\}$ ; 以及压力级的增量

$\{\Delta F(i)\}$  和加速度量  $\{\delta F(i)\}$ , 计算方法如下:

$$[0158] \quad \Delta X(i) = X(i) - X(i-1)$$

$$[0159] \quad \Delta Y(i) = Y(i) - Y(i-1), (2 \leq i \leq \text{FrameLen})$$

$$[0160] \quad \Delta F(i) = F(i) - F(i-1)$$

[0161] 其中

$$[0162] \quad \delta X(i) = \Delta X(i) - \Delta X(i-1)$$

$$[0163] \quad \delta Y(i) = \Delta Y(i) - \Delta Y(i-1), (3 \leq i \leq \text{FrameLen})$$

$$[0164] \quad \delta F(i) = \Delta F(i) - \Delta F(i-1)$$

[0165] 步骤 705, 输出直流分量: 把第 1 个笔迹特征参数的坐标和压力级放入以及第 2 个坐标增量  $(\Delta X(2), \Delta Y(2))$ , 第 2 个压力级增量  $\Delta F(2)$  输出缓存中;

[0166] 步骤 706, 加速度无损编码: 采用无损编码算法分别对加速度量系列  $\{\delta X(i)\}$ 、 $\{\delta Y(i)\}$  和  $\{\delta F(i)\}$  进行编码, 得到加速度量流;

[0167] 步骤 707, 码流输出: 按照坐标的 X, Y 方向, 压力级顺序把经过无损编码得到的码流放到输出缓存中, 它们之间用结束码 End\_Code 分开;

[0168] 步骤 708, 输出数据: 把输出缓存中的所有笔迹特征数据流输出, 结束编码。

[0169] 解码流程如图 7 中 720 所示, 详细步骤如下:

[0170] 步骤 721, 读取数据: 读取一笔的所有笔迹特征数据流放入输入缓存;

[0171] 步骤 722, 去掉起始码: 去掉笔迹特征数据流开头的起始码 Start\_Code;

[0172] 步骤 723, 读取颜色: 去掉起始码 Start\_Code 后直接取得这笔笔迹的颜色 C;

[0173] 步骤 724, 读取直流分量: 读取笔迹特征参数的第 1 个采样的坐标  $Z(1)$  和压力级  $F(1)$ ;

[0174] 步骤 725, 读取码流: 把所有加速度量流读取出来;

[0175] 步骤 726, 无损解码: 对读取到的加速度量流进行解码;

[0176] 步骤 727, 笔迹特征参数形成: 根据解码得到的加速度量和读取得到的直流分量计算出坐标的 X 方向系列  $\{X(i)\}$ , Y 方向系列  $\{Y(i)\}$ , 压力及系列  $\{F(i)\}$ ; 并组合出笔迹特征参数  $S(i)$ :

$$[0177] \quad S(i) = [Z(i), F(i), C], (1 \leq i \leq \text{FrameLen})$$

[0178] 其中  $Z(i) = \{X(i), Y(i)\}$ 。而

$$[0179] \quad X(i) = X(i-1) + \Delta X(i)$$

$$[0180] \quad Y(i) = Y(i-1) + \Delta Y(i), (2 \leq i \leq \text{FrameLen})$$

$$[0181] \quad F(i) = F(i-1) + \Delta F(i)$$

[0182] 其中

$$[0183] \quad \Delta X(i) = \Delta X(i-1) + \delta X(i)$$

$$[0184] \quad \Delta Y(i) = \Delta Y(i-1) + \delta Y(i), (3 \leq i \leq \text{FrameLen})$$

$$[0185] \quad \Delta F(i) = \Delta F(i-1) + \delta F(i)$$

[0186] 步骤 728, 输出数据: 把输出缓存中的所有笔迹特征参数输出, 解码结束。

[0187] 4、内容保存

[0188] 整个会议所有内容 (包括软画板上的图形、口头评述、图像视频) 都保存, 以便将来进行查阅。这样, 视频通信的参与者可以在空闲的时间里回顾该会议。另外, 不能参加的

人员也可以在随后的时间查阅此次视频通信。

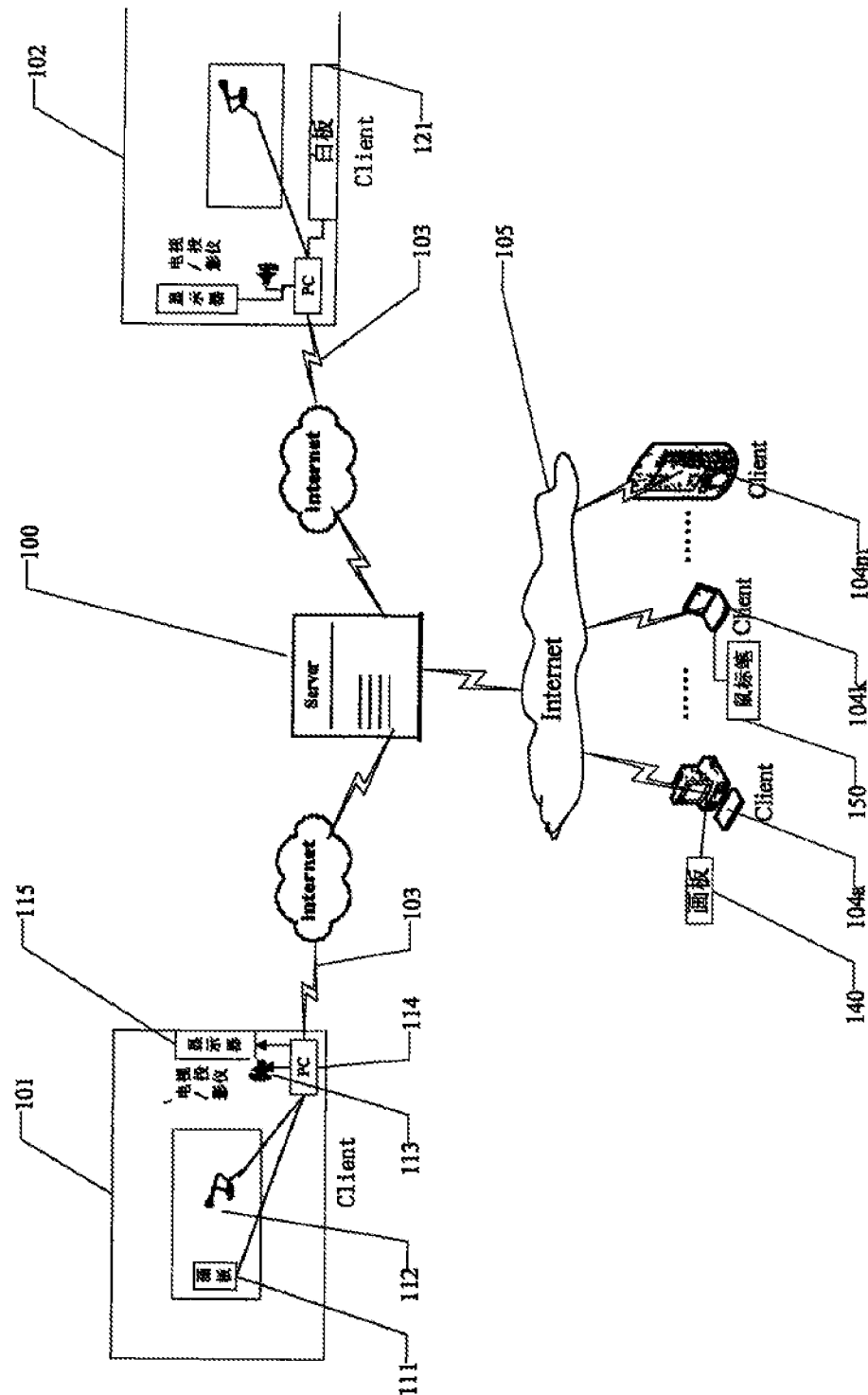


图 1

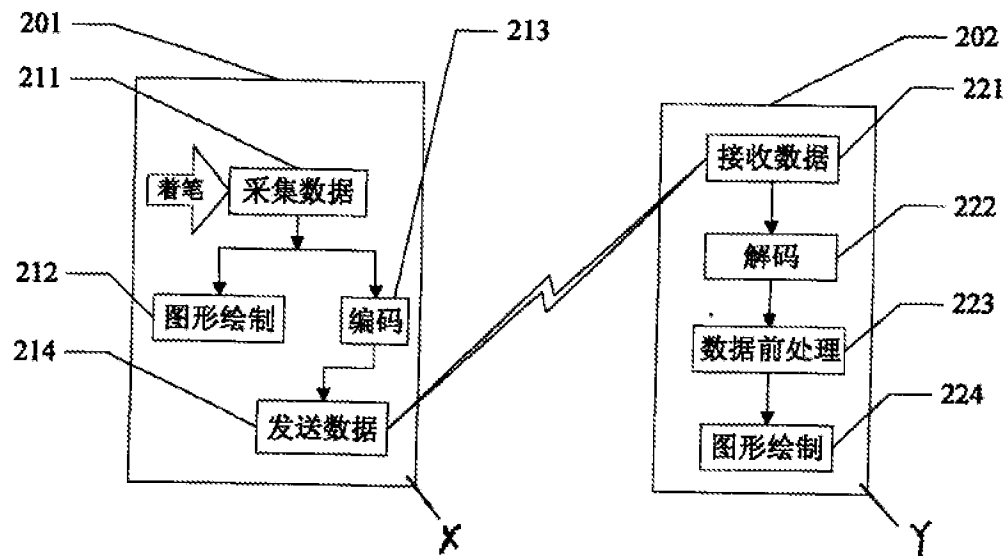


图 2

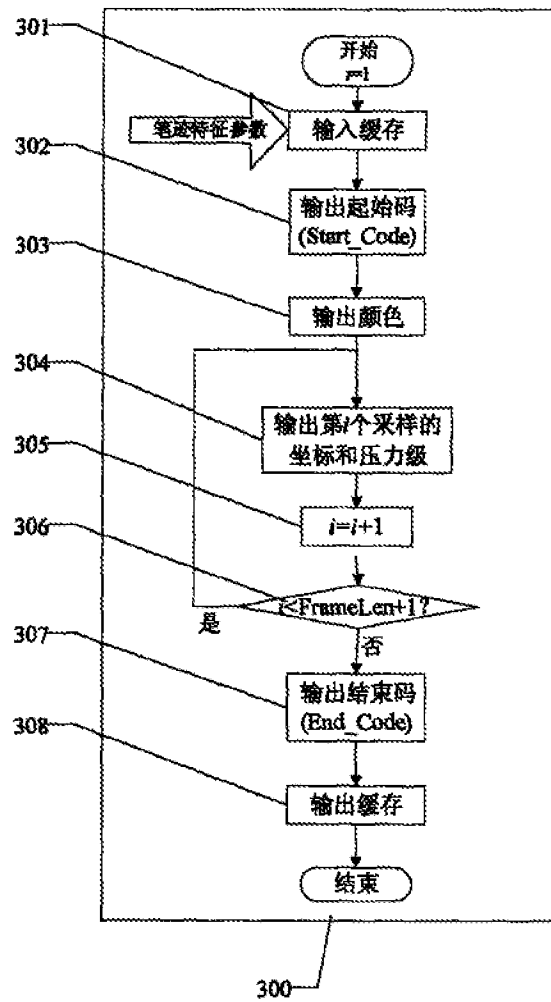


图 3a

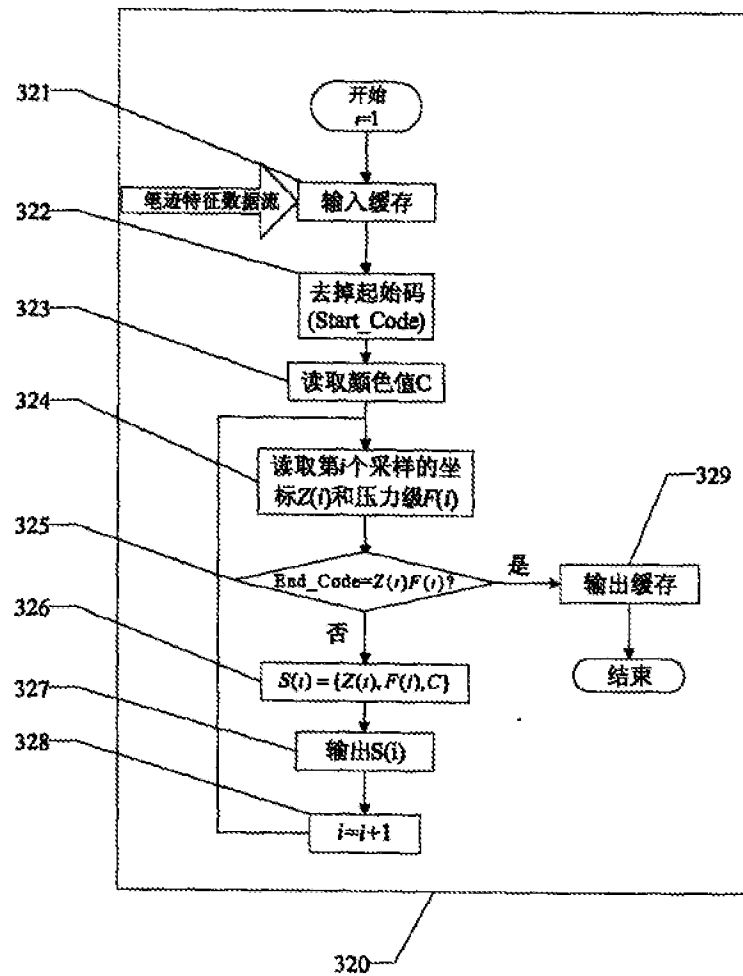


图 3b

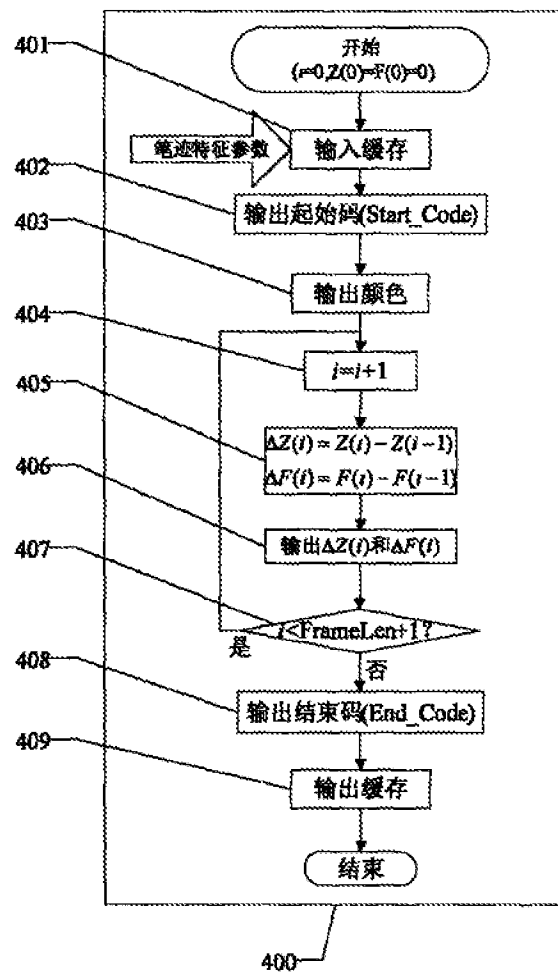


图 4a



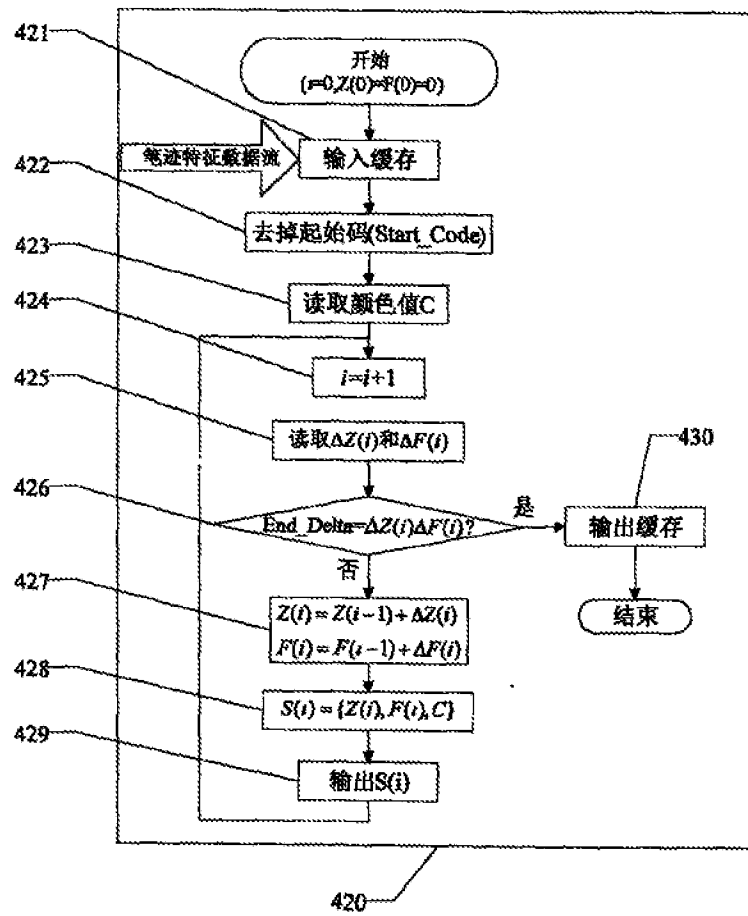


图 4b

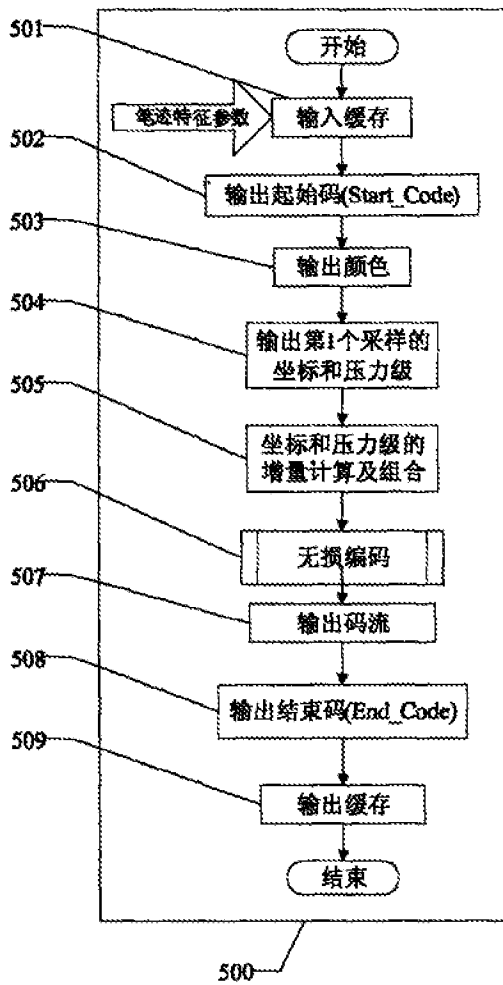


图 5a

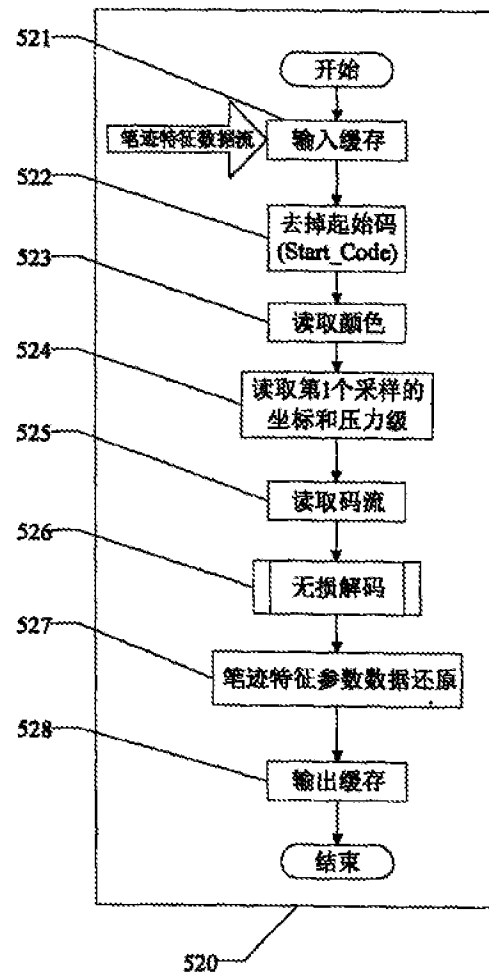


图 5b

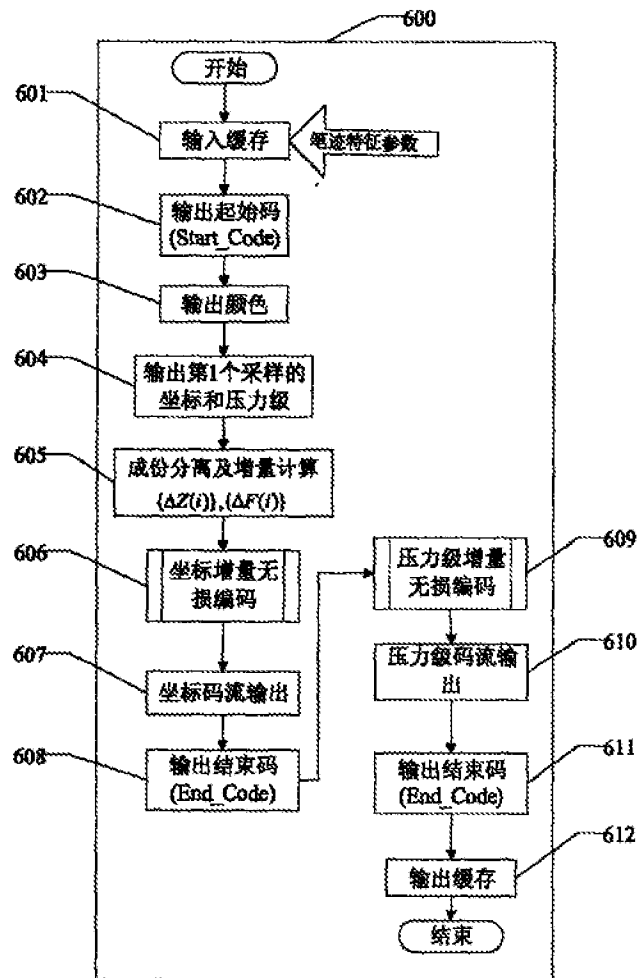


图 6a

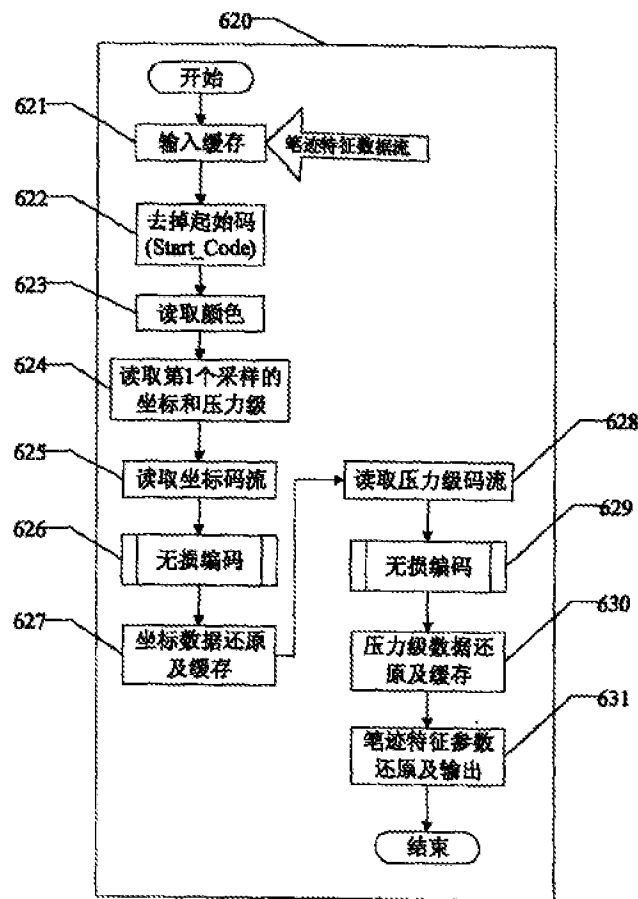


图 6b

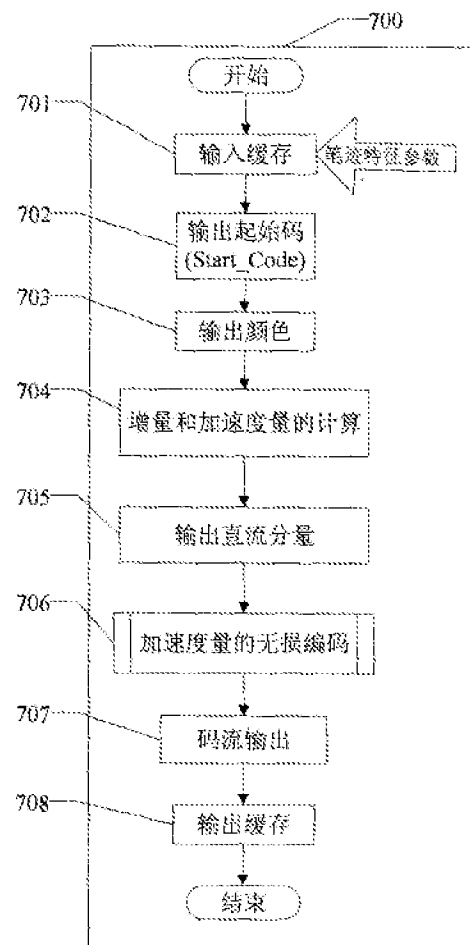


图 7a

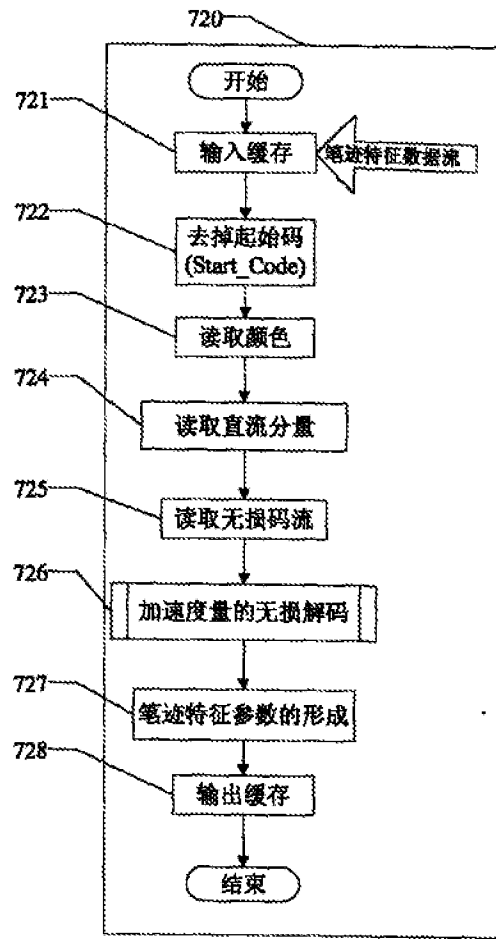


图 7b



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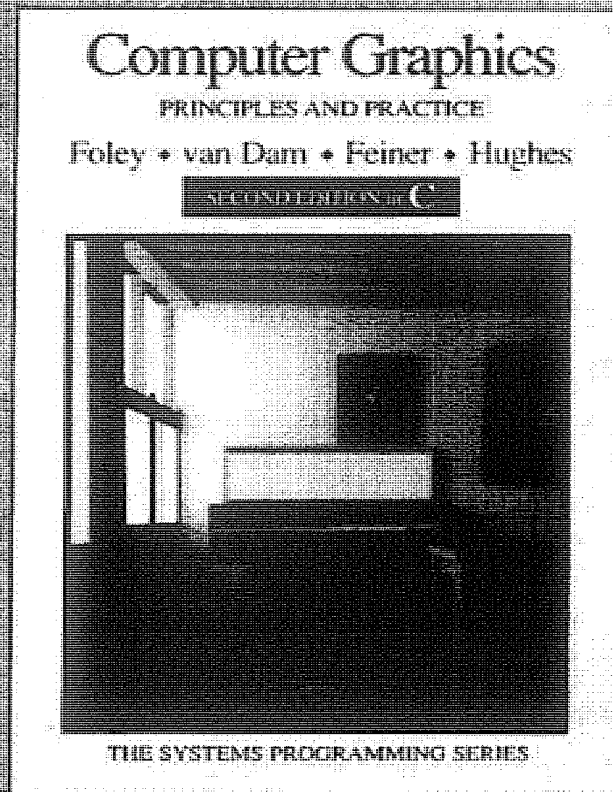
原书第2版

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# 计算机图形学原理及实践 C语言描述

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Steven K. Feiner John F. Hughes



**Computer Graphics**  
Principles and Practice  
Second Edition in C

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本书是计算机图形学领域的经典著作。本书由基础知识、用户界面、模型定义和图像合成四个部分组成,包括SRGP的编程、画二维图元的基本光栅图形学算法、图形硬件、几何变换、三维空间的观察、对象的层次结构和SPHIGS系统、输入设备、交互技术与交互任务、对话设计、用户界面软件、实体造型、消色光与彩色光、可视图像的真实性、可见面判定、光照模型与光照计算、图像处理与存储、高级光栅图形体系结构、高级几何与光栅算法、高级建模技术和动画等内容。

本书内容全面,涉及图形学的各个领域,可以作为计算机专业本科生和研究生的教材,同时也可供相关技术人员阅读。

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## 52 Programming in the Simple Raster Graphics Package (SRGP)

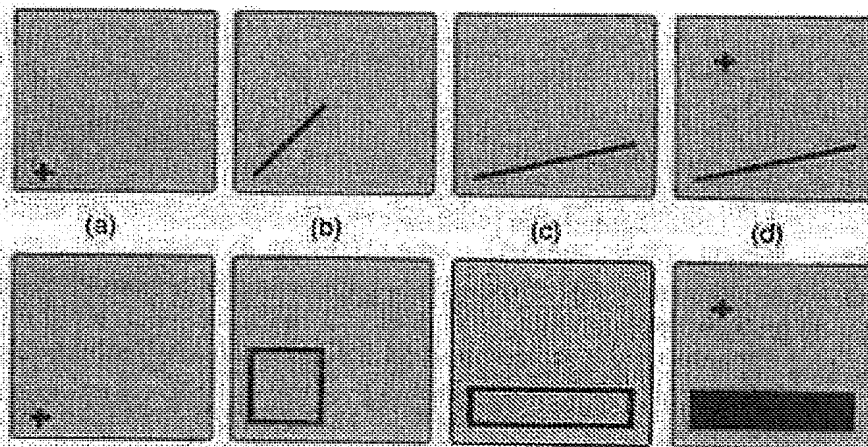


Fig. 2.23 Rubber-echo scenarios.

reset to the center of the screen whenever the locator is deactivated. Unless the programmer explicitly resets it, the measure (and feedback position, if the echo is active) is initialized to that same position when the device is reactivated. At any time, whether the device is active or inactive, the programmer can reset the locator's measure (the *position* portion, not the fields concerning the buttons) using

```
void SRGP.setLocatorMeasure (point position);
```

Resetting the measure while the locator is inactive has no immediate effect on the screen, but resetting it while the locator is active changes the echo (if any) accordingly. Thus, if the program wants the cursor to appear initially at a position other than the center when the locator is activated, a call to `SRGP.setLocatorMeasure` with that initial position must precede the call to `SRGP.setInputMode`. This technique is commonly used to achieve continuity of cursor position: The last measure before the locator was deactivated is stored, and the cursor is returned to that position when it is reactivated.

**Keyboard attributes and measure control.** Unlike the locator, whose echo is positioned to reflect movements of a physical device, there is no obvious screen position for a keyboard device's echo. The position is thus an attribute (with an implementation-specific default value) of the keyboard device that can be set via

```
void SRGP.setKeyboardEchoOrigin (point origin);
```

The default measure for the keyboard is automatically reset to the null string when the keyboard is deactivated. Setting the measure explicitly to a nonnull initial value just before activating the keyboard is a convenient way to present a default input string (displayed by SRGP as soon as echoing begins) that the user can accept as is or modify before pressing the Return key, thereby minimizing typing. The keyboard's measure is set via

```
void SRGP.setKeyboardMeasure (char *measure);
```

## 2.3 RASTER GRAPHICS FEATURES

By now, we have introduced most of the features of SRGP. This section discusses the remaining facilities that take particular advantage of raster hardware, especially the ability



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## Raster Graphics Features 53

to save and restore pieces of the screen as they are overlaid by other images, such as windows or temporary menus. Such image manipulations are done under control of window- and menu-manager application programs. We also introduce offscreen bitmaps (called *canvases*) for storing windows and menus, and we discuss the use of clipping rectangles.

### 2.3.1 Canvases

The best way to make complex icons or menus appear and disappear quickly is to create them once in memory and then to copy them onto the screen as needed. Raster graphics packages do this by generating the primitives in invisible, offscreen bitmaps or pixmaps of the requisite size, called *canvases* in SRGP, and then copying the canvases to and from display memory. This technique is, in effect, a type of buffering. Moving blocks of pixels back and forth is faster, in general, than is regenerating the information, given the existence of the fast SRGP\_copyPixel operation that we shall discuss soon.

An SRGP *canvas* is a data structure that stores an image as a 2D array of pixels. It also stores some control information concerning the size and attributes of the image. Each canvas represents its image in its own Cartesian coordinate system, which is identical to that of the screen shown in Fig. 2.1; in fact, the screen is itself a canvas, special solely in that it is the only canvas that is displayed. To make an image stored in an off-screen canvas visible, the application must copy it onto the screen canvas. Beforehand, the portion of the screen image where the new image—for example, a menu—will appear can be saved by copying the pixels in that region to an offscreen canvas. When the menu selection has taken place, the screen image is restored by copying back these pixels.

At any given time, there is one *currently active* canvas: the canvas into which new primitives are drawn and to which new attribute settings apply. This canvas may be the screen canvas (the default we have been using) or an offscreen canvas. The coordinates passed to the primitive procedures are expressed in terms of the local coordinate space of the currently active canvas. Each canvas also has its own complete set of SRGP attributes, which affect all drawing on that canvas and are set to the standard default values when the canvas is created. Calls to attribute-setting procedures modify only the attributes in the currently active canvas. It is convenient to think of a canvas as a virtual screen of program-specified dimensions, having its own associated pixmap, coordinate system, and attribute group. These properties of the canvas are sometimes called the *state* or *context* of the canvas.

When SRGP is initialized, the *screen canvas* is automatically created and made active. All our programs thus far have generated primitives into only that canvas. It is the only canvas visible on the screen, and its ID is SCREEN\_CANVAS, an SRGP constant. A new offscreen canvas is created by calling the following procedure, which returns the ID allocated for the new canvas:

```
canvasID SRGP.createCanvas (int width, int height);
```

Like the screen, the new canvas's local coordinate system origin (0, 0) is at the bottom-left corner and the top-right corner is at (width-1, height-1). A 1 by 1 canvas is therefore defined by width and height of 1, and its bottom-left and top-right corners are both (0, 0)! This is consistent with our treatment of pixels as being at grid intersections: The single pixel in a 1 by 1 canvas is at (0, 0).

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A newly created canvas is automatically made active and its pixels are initialized to color 0 (as is also done for the screen canvas before any primitives are displayed). Once a canvas is created, its size cannot be changed. Also, the programmer cannot control the number of bits per pixel in a canvas, since SRGP uses as many bits per pixel as the hardware allows. The attributes of a canvas are kept as part of its "local" state information; thus, the program does not need to save the currently active canvas's attributes explicitly before creating a new active canvas.

The application selects a previously created canvas to be the currently active canvas via

```
void SRGP.useCanvas (canvasID id);
```

A canvas being activated in no way implies that that canvas is made visible; an image in an offscreen canvas must be copied onto the screen canvas (using the `SGRP_copyPixel` procedure described shortly) in order to be seen.

Canvases are deleted by the following procedure, which may not be used to delete the screen canvas or the currently active canvas.

```
void SRGP.deleteCanvas (canvasID id);
```

The following procedures allow inquiry of the size of a canvas; one returns the rectangle which defines the canvas coordinate system (the bottom-left point always being (0, 0)), and the other returns the width and height as separate quantities.

```
rectangle SRGP.inquireCanvasExtent (canvasID id);  
void SRGP.inquireCanvasSize (canvasID id, int *width, int *height);
```

Let us examine the way canvases can be used for the implementation of `PerformPullDownMenuInteraction`, the procedure called by the high-level interaction handler presented in Fig. 2.22 and Section 2.2.6. The procedure is implemented by the pseudocode of Fig. 2.24, and its sequence of actions is illustrated in Fig. 2.25. Each menu has a unique

```
int PerformPullDownMenuInteraction (int menuID);  
/* The saving/copying of rectangular regions of canvases is described in Section 2.3.3. */  
{  
    highlight the menu header in the menu bar;  
    menuBodyScreenExtent = screen-area rectangle at which menu body should appear;  
    save the current pixels of the menuBodyScreenExtent in a temporary canvas;  
    /* See Fig. 2.25a. */  
    copy menu body image from body canvas to menuBodyScreenExtent;  
    /* See Fig. 2.25b and C code in Fig. 2.28. */  
    wait for button-up signaling the user made a selection, then get locator measure;  
    copy saved image from temporary canvas back to menuBodyScreenExtent;  
    /* See Fig. 2.25c. */  
    if (GEOM.pointInRect (measureOfLocator.position, menuBodyScreenExtent))  
        calculate and return index of chosen item, using y coord of measure position;  
    else  
        return 0;  
} /* PerformPullDownMenuInteraction */
```

**Fig. 2.24 Pseudocode for PerformPullDownMenuInteraction.**



## 2.3

## Raster Graphics Features 55

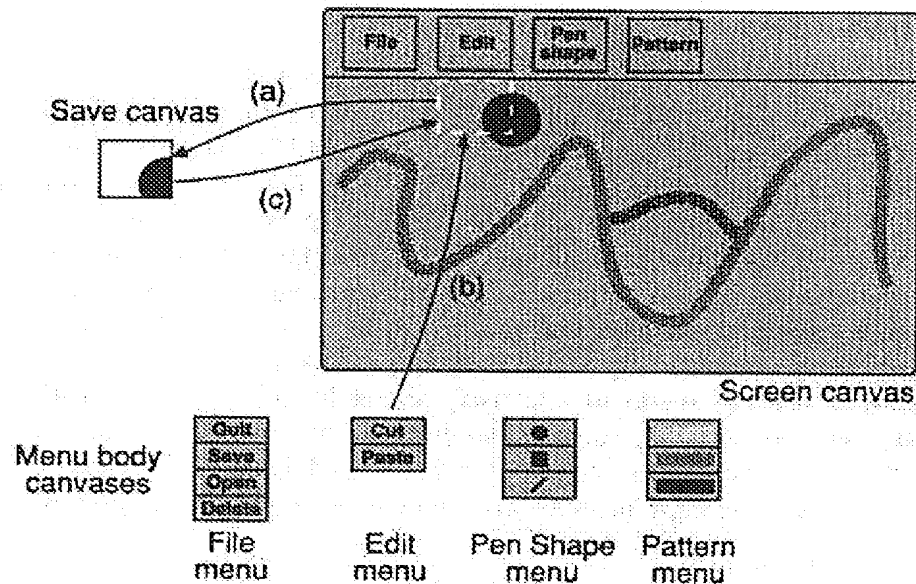


Fig. 2.25 Saving and restoring area covered by menu body.

ID (returned by the `CorrelateMenuBar` function) that can be used to locate a database record containing the following information about the appearance of the menu body:

- The ID of the canvas storing the menu's body
- The rectangular area (called *menuBodyScreenExtent* in the pseudocode), specified in screen-canvas coordinates, in which the menu's body should appear when the user pulls down the menu by clicking in its header

### 2.3.2 Clipping Rectangles

Often, it is desirable to restrict the effect of graphics primitives to a subregion of the active canvas, to protect other portions of the canvas. To facilitate this, SRGP maintains a *clip rectangle* attribute. All primitives are clipped to the boundaries of this rectangle; that is, primitives (or portions of primitives) lying outside the clip rectangle are not drawn. Like any attribute, the clip rectangle can be changed at any time, and its most recent setting is stored with the canvas's attribute group. The default clipping rectangle (what we have used so far) is the full canvas; it can be changed to be smaller than the canvas, but it cannot extend beyond the canvas boundaries. The relevant set and inquiry calls for the clip rectangle are

```
void SRGP.setClipRectangle (rectangle clipRect);
rectangle SRGP.inquireClipRectangle (void);
```

A painting application like that presented in Section 2.2.4 would use the clip rectangle to restrict the placement of paint to the drawing region of the screen, ensuring that the surrounding menu areas are not damaged. Although SRGP offers only a single upright rectangle clipping boundary, some more sophisticated software such as POSTSCRIPT offers multiple, arbitrarily shaped clipping regions.

# 3

## Basic Raster Graphics Algorithms for Drawing 2D Primitives

A raster graphics package approximates mathematical ("ideal") primitives, described in terms of vertices on a Cartesian grid, by sets of pixels of the appropriate intensity of gray or color. These pixels are stored as a bitmap or pixmap in CPU memory or in a frame buffer. In the previous chapter, we studied the features of SRGP, a typical raster graphics package, from an *application programmer's* point of view. The purpose of this chapter is to look at SRGP from a *package implementor's* point of view—that is, in terms of the fundamental algorithms for scan converting primitives to pixels, subject to their attributes, and for clipping them against an upright clip rectangle. Examples of scan-converted and clipped primitives are shown in Fig. 3.1.

More advanced algorithms that handle features not supported in SRGP are used in more sophisticated and complex packages; such algorithms are treated in Chapter 19. The algorithms in this chapter are discussed in terms of the 2D integer Cartesian grid, but most of the scan-conversion algorithms can be extended to floating point, and the clipping algorithms can be extended both to floating point and to 3D. The final section introduces the concept of antialiasing—that is, minimizing jaggies by making use of a system's ability to vary a pixel's intensity.

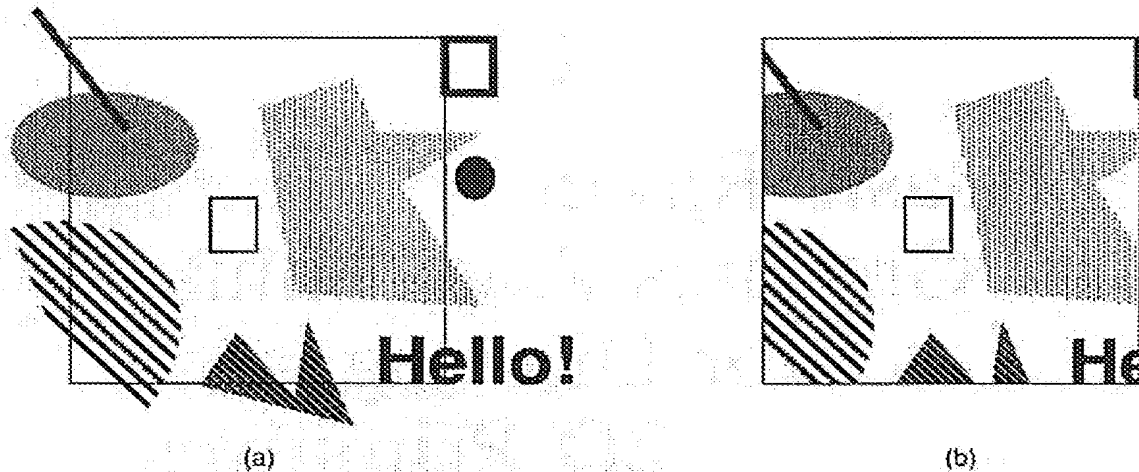
### 3.1 OVERVIEW

#### 3.1.1 Implications of Display-System Architecture

The fundamental conceptual model of Section 1.7 presents a graphics package as the system that mediates between the application program (and its application data structure/model) and the display hardware. The package gives the application program a device-



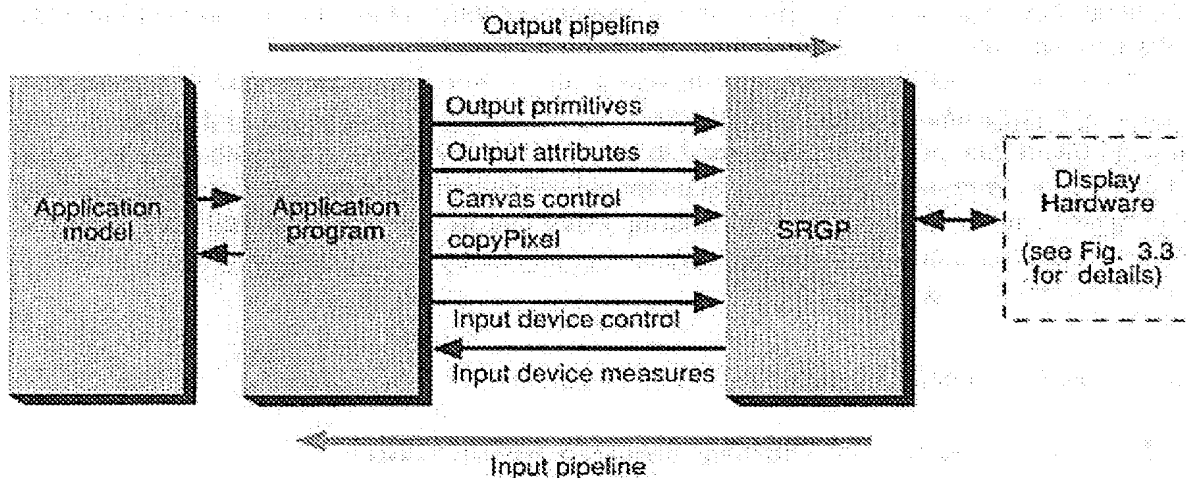
## 68 Basic Raster Graphics Algorithms for Drawing 2D Primitives



**Fig. 3.1** Clipping SRGP primitives to a rectangular clip region. (a) Primitives and clipping rectangle. (b) Clipped results.

independent interface to the hardware, as shown in Fig. 3.2, where SRGP's procedures are partitioned into those forming an output pipeline and those forming an input pipeline.

In the *output pipeline*, the application program takes descriptions of objects in terms of primitives and attributes stored in or derived from an application model or data structure, and specifies them to the graphics package, which in turn clips and scan converts them to the pixels seen on the screen. The package's primitive-generation procedures specify *what* is to be generated, the attribute procedures specify *how* primitives are to be generated, the SRGP\_copyPixel procedure specifies *how* images are to be modified, and the canvas-control procedures specify *where* the images are to be generated. In the *input pipeline*, a user interaction at the display end is converted to measure values returned by the package's sampling or event-driven input procedures to the application program; it typically uses those



**Fig. 3.2** SRGP as intermediary between the application program and the graphics system, providing output and input pipelines.

values to modify the model or the image on the screen. Procedures relating to input include those to initialize and control input devices and those to obtain the latter's measures during interaction. We do not cover either SRGP's canvas management or its input handling in this book, since these topics have little to do with raster graphics and are primarily data-structure and low-level systems-software issues, respectively.

An SRGP implementation must communicate with a potentially wide variety of display devices. Some display systems are attached as peripherals with their own internal frame buffers and display controllers. These display controllers are processors specialized to interpret and execute drawing commands that generate pixels into the frame buffer. Other, simpler systems are refreshed directly from the memory used by the CPU. Output-only subsets of the package may drive raster hardcopy devices. These various types of hardware architectures are discussed in more detail in Chapters 4 and 18. In any display-system architecture, the CPU must be able to read and write individual pixels in the frame buffer. It is also convenient to be able to move rectangular blocks of pixels to and from the frame buffer to implement the copyPixel (bitBlt) type of operation. This facility is used not for generating primitives directly but to make portions of offscreen bitmaps or pixmaps visible and to save and restore pieces of the screen for window management, menu handling, scrolling, and so on.

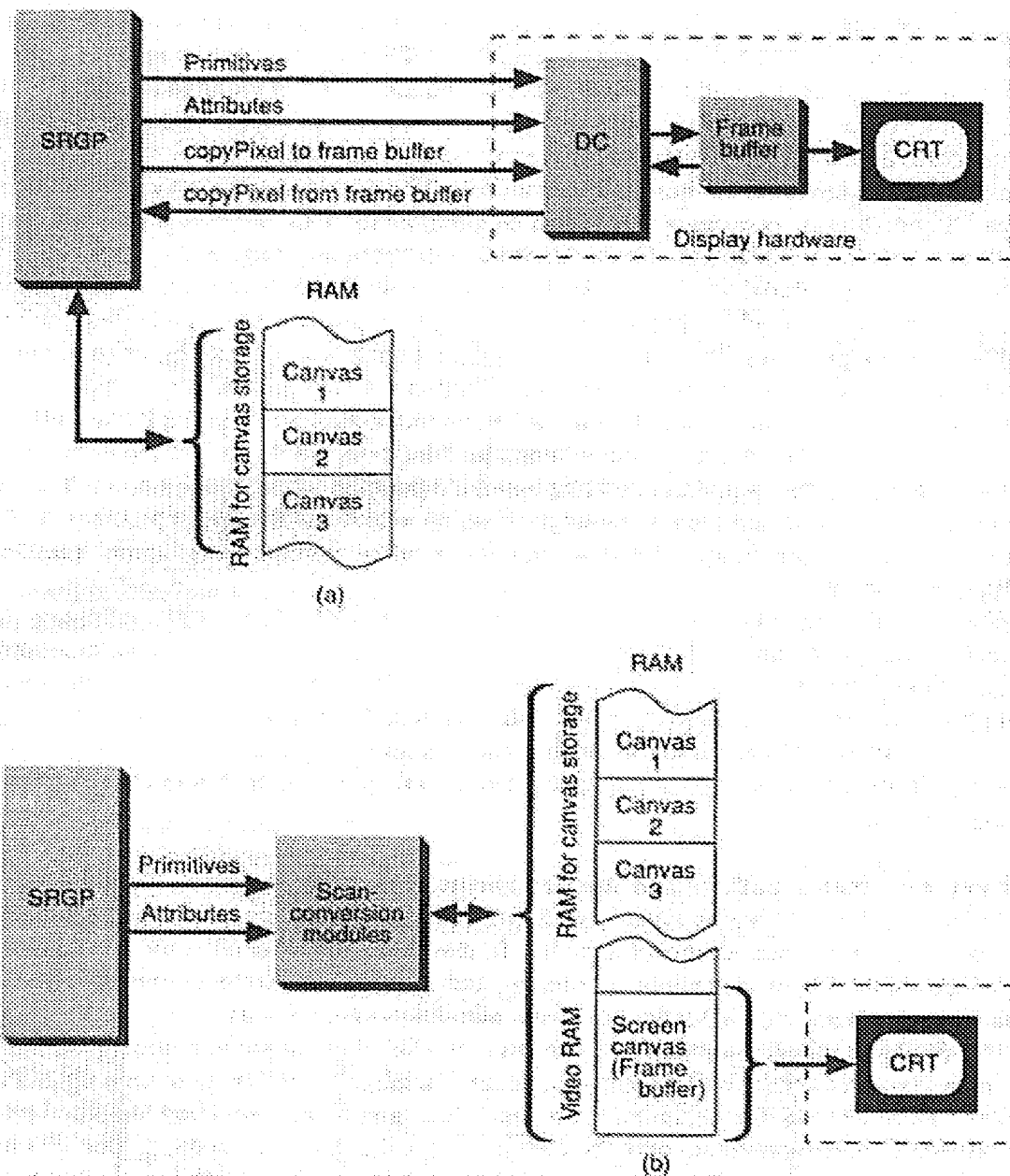
Whereas all implementations for systems that refresh from CPU memory are essentially identical because all the work is done in software, implementations for display controller and hardcopy systems vary considerably, depending on what the respective hardware devices can do by themselves and what remains for the software to do. Naturally, in any architecture, software scan conversion must be used to generate both primitives and attributes not directly supported in hardware. Let's look briefly at the range of architectures and implementations.

**Displays with frame buffers and display controllers.** SRGP has the least amount of work to do if it drives a display controller that does its own scan conversion and handles all of SRGP's primitives and attributes directly. In this case, SRGP needs only to convert its internal representation of primitives, attributes, and write modes to the formats accepted by the display peripheral that actually draws the primitives (Fig. 3.3 a).

The display-controller architecture is most powerful when memory mapping allows the CPU to access the frame buffer directly and the display controller to access the CPU's memory. The CPU can then read and write individual pixels and copyPixel blocks of pixels with normal CPU instructions, and the display controller can scan convert into offscreen canvases and also use its copyPixel instruction to move pixels between the two memories or within its own frame buffer. When the CPU and the display controller can run asynchronously, there must be synchronization to avoid memory conflicts. Often, the display controller is controlled by the CPU as a coprocessor. If the display peripheral's display controller can only scan convert into its own frame buffer and cannot write pixels into CPU memory, we need a way to generate primitives in an offscreen canvas. The package then uses the display controller for scan conversion into the screen canvas but must do its own software scan conversion for offscreen canvases. The package can, of course, copyPixel images scan converted by the hardware from the frame buffer to offscreen canvases.



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**Fig. 3.3** SRGP driving two types of display systems. (a) Display peripheral with display controller and frame buffer. (b) No display controller, memory-shared frame buffer.

**Displays with frame buffers only.** For displays without a display controller, SRGP does its own scan conversion into both offscreen canvases and the frame buffer. A typical organization for such an SRGP implementation that drives a shared-memory frame buffer is shown in Fig. 3.3 (b). Note that we show only the parts of memory that constitute the frame

buffer and store the canvases managed by SRGP; the rest of the memory is occupied by all the usual software and data, including, of course, SRGP itself.

**Hardcopy devices.** As explained in Chapter 4, hardcopy devices range in their capabilities along the same spectrum as display systems. The simplest devices accept only one scan line at a time and rely on the software to provide that scan line exactly when it is to be imaged on film or on paper. For such simple hardware, SRGP must generate a complete bitmap or pixmap and scan it out one line at a time to the output device. Slightly smarter devices can accept an entire frame (page) at a time. Yet more powerful equipment has built-in scan-conversion hardware, often called raster image processors (RIPs). At the high end of the scale, PostScript printers have internal "engines" that read PostScript programs describing pages in a device-independent fashion; they interpret such programs to produce the primitives and attributes that are then scan converted. The fundamental clipping and scan-conversion algorithms are essentially independent of the raster device's output technology; therefore, we need not address hardcopy devices further in this chapter.

### 3.1.2 The Output Pipeline in Software

Here we examine the output pipeline driving simple frame-buffer displays only in order to address the problems of software clipping and scan conversion. The various algorithms introduced are discussed at a general, machine-independent level, so they apply to both software and hardware (or microcode) implementations.

As each output primitive is encountered by SRGP, the package *scan converts* the primitive: Pixels are written in the current canvas according to their applicable attributes and current write mode. The primitive is also *clipped* to the clip rectangle; that is, pixels belonging to the primitive that are outside the clip region are not displayed. There are several ways of doing clipping. The obvious technique is to clip a primitive prior to scan conversion by computing its analytical intersections with the clip-rectangle boundaries; these intersection points are then used to define new vertices for the clipped version of the primitive. The advantage of clipping before scan converting is, of course, that the scan converter must deal with only the clipped version of the primitive, not with the original (possibly much larger) one. This technique is used most often for clipping lines, rectangles, and polygons, for which clipping algorithms are fairly simple and efficient.

The simplest, brute-force clipping technique, called *scissoring*, is to scan convert the entire primitive but to write only the visible pixels in the clip-rectangle region of the canvas. In principle, this is done by checking each pixel's coordinates against the  $(x, y)$  bounds of the rectangle before writing that pixel. In practice, there are shortcuts that obviate having to check adjacent pixels on a scan line, as we shall see later. This type of clipping is thus accomplished on the fly; if the bounds check can be done quickly (e.g., by a tight inner loop running completely in microcode or in an instruction cache), this approach may actually be faster than first clipping the primitive and then scan converting the resulting, clipped portions. It also generalizes to arbitrary clip regions.

A third technique is to generate the entire collection of primitives into a temporary canvas and then to copyPixel only the contents of the clip rectangle to the destination canvas. This approach is wasteful of both space and time, but is easy to implement and is often used for text. Data structures for minimizing this overhead are discussed in Chapter 19.



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Raster displays invoke clipping and scan-conversion algorithms each time an image is created or modified. Hence, these algorithms not only must create visually satisfactory images, but also must execute as rapidly as possible. As discussed in detail in later sections, scan-conversion algorithms use *incremental methods* to minimize the number of calculations (especially multiplies and divides) performed during each iteration; further, these calculations employ integer rather than floating-point arithmetic. As shown in Chapter 18, speed can be increased even further by using multiple parallel processors to scan convert simultaneously entire output primitives or pieces of them.

### 3.2 SCAN CONVERTING LINES

A scan-conversion algorithm for lines computes the coordinates of the pixels that lie on or near an ideal, infinitely thin straight line imposed on a 2D raster grid. In principle, we would like the sequence of pixels to lie as close to the ideal line as possible and to be as straight as possible. Consider a 1-pixel-thick approximation to an ideal line; what properties should it have? For lines with slopes between  $-1$  and  $1$  inclusive, exactly 1 pixel should be illuminated in each column; for lines with slopes outside this range, exactly 1 pixel should be illuminated in each row. All lines should be drawn with constant brightness, independent of length and orientation, and as rapidly as possible. There should also be provisions for drawing lines that are more than 1 pixel wide, centered on the ideal line, that are affected by line-style and pen-style attributes, and that create other effects needed for high-quality illustrations. For example, the shape of the endpoint regions should be under programmer control to allow beveled, rounded, and mitered corners. We would even like to be able to minimize the jaggies due to the discrete approximation of the ideal line by using antialiasing techniques exploiting the ability to set the intensity of individual pixels on  $n$ -bits-per-pixel displays.

For now, we consider only "optimal," 1-pixel-thick lines that have exactly 1 bilevel pixel in each column (or row for steep lines). Later in the chapter, we consider thick primitives and deal with styles.

To visualize the geometry, we recall that SRGP represents a pixel as a circular dot centered at that pixel's  $(x, y)$  location on the integer grid. This representation is a convenient approximation to the more or less circular cross-section of the CRT's electron beam, but the exact spacing between the beam spots on an actual display can vary greatly among systems. In some systems, adjacent spots overlap; in others, there may be space between adjacent vertical pixels; in most systems, the spacing is tighter in the horizontal than in the vertical direction. Another variation in coordinate-system representation arises in systems, such as the Macintosh, that treat pixels as being centered in the rectangular box between adjacent grid lines instead of on the grid lines themselves. In this scheme, rectangles are defined to be all pixels interior to the mathematical rectangle defined by two corner points. This definition allows zero-width (null) canvases: The rectangle from  $(x, y)$  to  $(x, y)$  contains no pixels, unlike the SRGP canvas, which has a single pixel at that point. For now, we continue to represent pixels as disjoint circles centered on a uniform grid, although we shall make some minor changes when we discuss antialiasing.

Figure 3.4 shows a highly magnified view of a 1-pixel-thick line and of the ideal line that it approximates. The intensified pixels are shown as filled circles and the nonintensified

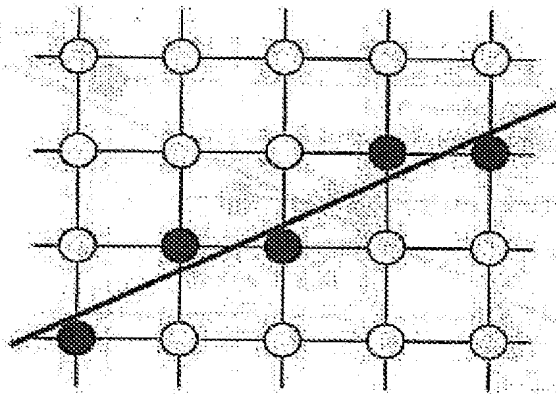


Fig. 3.4 A scan-converted line showing intensified pixels as black circles.

pixels are shown as unfilled circles. On an actual screen, the diameter of the roughly circular pixel is larger than the interpixel spacing, so our symbolic representation exaggerates the discreteness of the pixels.

Since SRGP primitives are defined on an integer grid, the endpoints of a line have integer coordinates. In fact, if we first clip the line to the clip rectangle, a line intersecting a clip edge may actually have an endpoint with a noninteger coordinate value. The same is true when we use a floating-point raster graphics package. (We discuss these noninteger intersections in Section 3.2.3.) Assume that our line has slope  $|m| \leq 1$ ; lines at other slopes can be handled by suitable changes in the development that follows. Also, the most common lines—those that are horizontal, are vertical, or have a slope of  $\pm 1$ —can be handled as trivial special cases because these lines pass through only pixel centers (see Exercise 3.1).

### 3.2.1 The Basic Incremental Algorithm

The simplest strategy for scan conversion of lines is to compute the slope  $m$  as  $\Delta y / \Delta x$ , to increment  $x$  by 1 starting with the leftmost point, to calculate  $y_i = mx_i + B$  for each  $x_i$ , and to intensify the pixel at  $(x_i, \text{Round}(y_i))$ , where  $\text{Round}(y_i) = \text{Floor}(0.5 + y_i)$ . This computation selects the closest pixel—that is, the pixel whose distance to the true line is smallest.<sup>1</sup> This brute-force strategy is inefficient, however, because each iteration requires a floating-point (or binary fraction) multiply, addition, and invocation of Floor. We can eliminate the multiplication by noting that

$$y_{i+1} = mx_{i+1} + B = m(x_i + \Delta x) + B = y_i + m\Delta x,$$

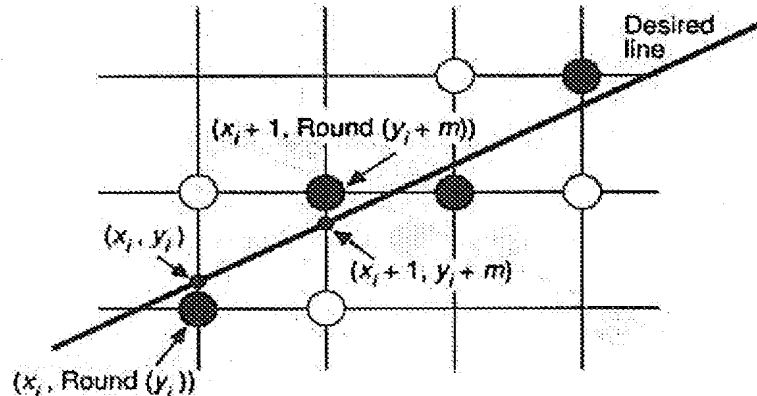
and, if  $\Delta x = 1$ , then  $y_{i+1} = y_i + m$ .

Thus, a unit change in  $x$  changes  $y$  by  $m$ , which is the slope of the line. For all points  $(x_i, y_i)$  on the line, we know that, if  $x_{i+1} = x_i + 1$ , then  $y_{i+1} = y_i + m$ ; that is, the values of  $x$  and  $y$  are defined in terms of their previous values (see Fig. 3.5). This is what defines an

<sup>1</sup>In Chapter 19, we discuss various measures of closeness for lines and general curves (also called *error measures*).



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Fig. 3.5 Incremental calculation of  $(x, y)$ .

incremental algorithm: At each step, we make incremental calculations based on the preceding step.

We initialize the incremental calculation with  $(x_0, y_0)$ , the integer coordinates of an endpoint. Note that this incremental technique avoids the need to deal with the  $y$  intercept,  $B$ , explicitly. If  $|m| > 1$ , a step in  $x$  creates a step in  $y$  that is greater than 1. Thus, we must reverse the roles of  $x$  and  $y$  by assigning a unit step to  $y$  and incrementing  $x$  by  $\Delta x = \Delta y/m = 1/m$ . Line, the procedure in Fig. 3.6, implements this technique. The start point must be the left endpoint. Also, it is limited to the case  $-1 \leq m \leq 1$ , but other slopes may be accommodated by symmetry. The checking for the special cases of horizontal, vertical, or diagonal lines is omitted.

WritePixel, used by Line, is a low-level procedure provided by the device-level software; it places a value into a canvas for a pixel whose coordinates are given as the first two arguments.<sup>2</sup> We assume here that we scan convert only in replace mode; for SRGP's other write modes, we must use a low-level ReadPixel procedure to read the pixel at the destination location, logically combine that pixel with the source pixel, and then write the result into the destination pixel with WritePixel.

This algorithm is often referred to as a *digital differential analyzer (DDA)* algorithm. The DDA is a mechanical device that solves differential equations by numerical methods: It traces out successive  $(x, y)$  values by simultaneously incrementing  $x$  and  $y$  by small steps proportional to the first derivative of  $x$  and  $y$ . In our case, the  $x$  increment is 1, and the  $y$  increment is  $dy/dx = m$ . Since real variables have limited precision, summing an inexact  $m$  repetitively introduces cumulative error buildup and eventually a drift away from a true  $\text{Round}(y_i)$ ; for most (short) lines, this will not present a problem.

### 3.2.2 Midpoint Line Algorithm

The drawbacks of procedure Line are that rounding  $y$  to an integer takes time, and that the variables  $y$  and  $m$  must be real or fractional binary because the slope is a fraction. Bresenham developed a classic algorithm [BRES65] that is attractive because it uses only

<sup>2</sup>If such a low-level procedure is not available, the SRGP\_pointCoord procedure may be used, as described in the SRGP reference manual.

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$M_1$	$M_2$
Translate	Translate
Scale	Scale
Rotate	Rotate
Scale (with $s_x = s_y$ )	Rotate

In these cases, we need not be concerned about the *order* of matrix manipulation.

### 5.4 THE WINDOW-TO-VIEWPORT TRANSFORMATION

Some graphics packages allow the programmer to specify output primitive coordinates in a floating-point *world-coordinate* system, using whatever units are meaningful to the application program: angstroms, microns, meters, miles, light-years, and so on. The term *world* is used because the application program is representing a world that is being interactively created or displayed to the user.

Given that output primitives are specified in world coordinates, the graphics subroutine package must be told how to map world coordinates onto screen coordinates (we use the specific term *screen coordinates* to relate this discussion specifically to SRGP, but that hardcopy output devices might be used, in which case the term *device coordinates* would be more appropriate). We could do this mapping by having the application programmer provide the graphics package with a transformation matrix to effect the mapping. Another way is to have the application programmer specify a rectangular region in world coordinates, called the *world-coordinate window*, and a corresponding rectangular region in screen coordinates, called the *viewport*, into which the world-coordinate window is to be mapped. The transformation that maps the window into the viewport is applied to all of the output primitives in world coordinates, thus mapping them into screen coordinates. Figure 5.10 shows this concept. As seen in this figure, if the window and viewport do not have the same height-to-width ratio, a *nonuniform scaling* occurs. If the application program changes the window or viewport, then new output primitives drawn onto the screen will be affected by the change. Existing output primitives are not affected by such a change.

The modifier *world-coordinate* is used with *window* to emphasize that we are not discussing a *window-manager window*, which is a different and more recent concept, and

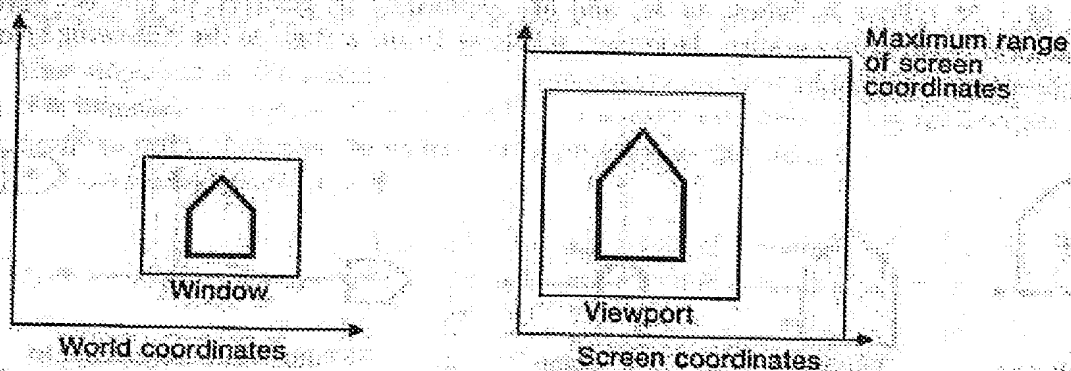
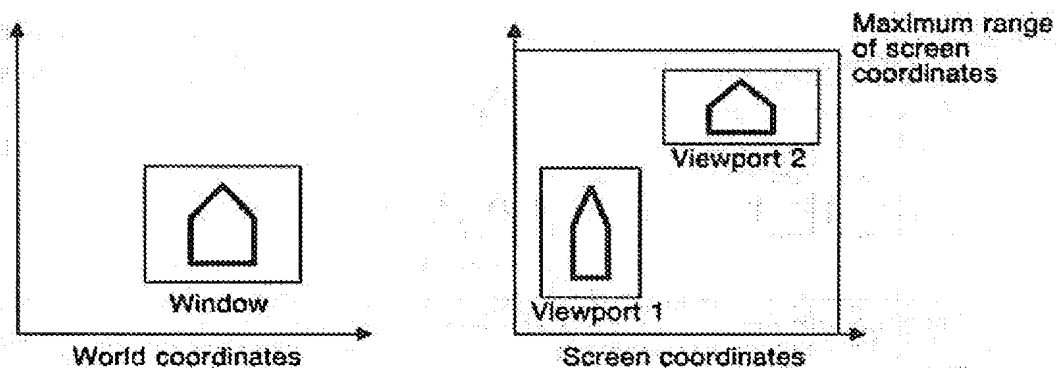


Fig. 5.10 The window in world coordinates and the viewport in screen coordinates determine the mapping that is applied to all the output primitives in world coordinates.



## 5.4

## The Window-to-Viewport Transformation 211



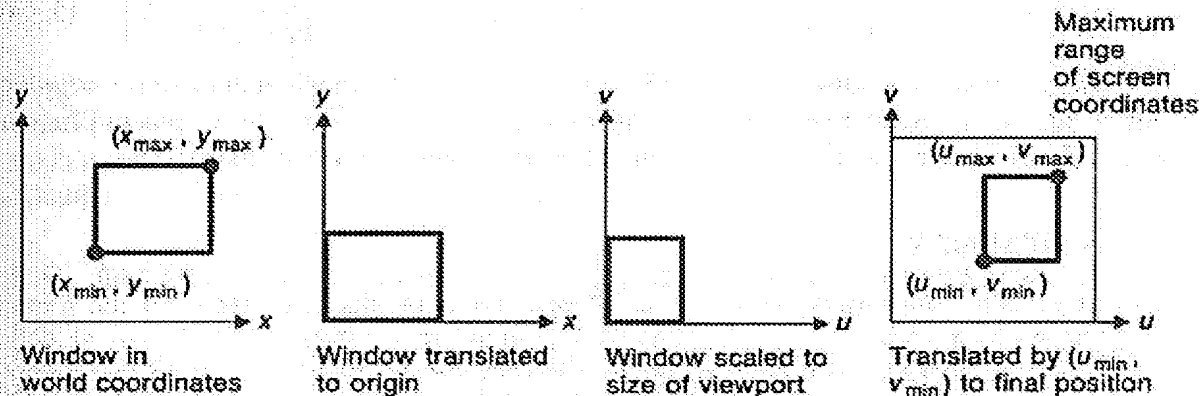
**Fig. 5.11** The effect of drawing output primitives with two viewports. Output primitives specifying the house were first drawn with viewport 1, the viewport was changed to viewport 2, and then the application program again called the graphics package to draw the output primitives.

which unfortunately has the same name. Whenever there is no ambiguity as to which type of window is meant, we will drop the modifier.

If SRGP were to provide world-coordinate output primitives, the viewport would be on the current canvas, which defaults to canvas 0, the screen. The application program would be able to change the window or the viewport at any time, in which case subsequently specified output primitives would be subjected to a new transformation. If the change included a different viewport, then the new output primitives would be located on the canvas in positions different from those of the old ones, as shown in Fig. 5.11.

A window manager might map SRGP's canvas 0 into less than a full-screen window, in which case not all of the canvas or even of the viewport would necessarily be visible. In Chapter 10, we further discuss the relationships among world-coordinate windows, viewports, and window-manager windows.

Given a window and viewport, what is the transformation matrix that maps the window from world coordinates into the viewport in screen coordinates? This matrix can be developed as a three-step transformation composition, as suggested in Fig. 5.12. The



**Fig. 5.12** The steps in transforming a world-coordinate window into a viewport.

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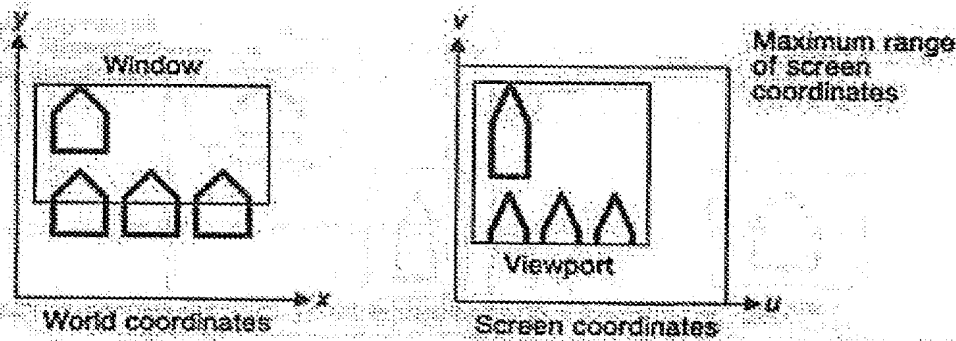


Fig. 5.13 Output primitives in world coordinates are clipped against the window. Those that remain are displayed in the viewport.

window, specified by its lower-left and upper-right corners, is first translated to the origin of world coordinates. Next, the size of the window is scaled to be equal to the size of the viewport. Finally, a translation is used to position the viewport. The overall matrix  $M_{wv}$  is:

$$\begin{aligned}
 M_{wv} &= T(u_{\min}, v_{\min}) \cdot S\left(\frac{u_{\max} - u_{\min}}{x_{\max} - x_{\min}}, \frac{v_{\max} - v_{\min}}{y_{\max} - y_{\min}}\right) \cdot T(-x_{\min}, -y_{\min}) \\
 &= \begin{bmatrix} 1 & 0 & u_{\min} \\ 0 & 1 & v_{\min} \\ 0 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} \frac{u_{\max} - u_{\min}}{x_{\max} - x_{\min}} & 0 & 0 \\ 0 & \frac{v_{\max} - v_{\min}}{y_{\max} - y_{\min}} & 0 \\ 0 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 & -x_{\min} \\ 0 & 1 & -y_{\min} \\ 0 & 0 & 1 \end{bmatrix} \\
 &= \begin{bmatrix} \frac{u_{\max} - u_{\min}}{x_{\max} - x_{\min}} & 0 & -x_{\min} \cdot \frac{u_{\max} - u_{\min}}{x_{\max} - x_{\min}} + u_{\min} \\ 0 & \frac{v_{\max} - v_{\min}}{y_{\max} - y_{\min}} & -y_{\min} \cdot \frac{v_{\max} - v_{\min}}{y_{\max} - y_{\min}} + v_{\min} \\ 0 & 0 & 1 \end{bmatrix} \quad (5.33)
 \end{aligned}$$

Multiplying  $P = M_{wv} [x \ y \ 1]^T$  gives the expected result:

$$P = \begin{bmatrix} (x - x_{\min}) \cdot \frac{u_{\max} - u_{\min}}{x_{\max} - x_{\min}} + u_{\min} & (y - y_{\min}) \cdot \frac{v_{\max} - v_{\min}}{y_{\max} - y_{\min}} + v_{\min} & 1 \end{bmatrix} \quad (5.34)$$

Many graphics packages combine the window-viewport transformation with clipping of output primitives against the window. The concept of clipping was introduced in Chapter 3; Fig. 5.13 illustrates clipping in the context of windows and viewports.

### 5.5 EFFICIENCY

The most general composition of  $R$ ,  $S$ , and  $T$  operations produces a matrix of the form

$$M = \begin{bmatrix} r_{11} & r_{12} & t_x \\ r_{21} & r_{22} & t_y \\ 0 & 0 & 1 \end{bmatrix} \quad (5.35)$$

The upper  $2 \times 2$  submatrix is a composite rotation and scale matrix, whereas  $t_x$  and  $t_y$  are composite translations. Calculating  $M \cdot P$  as a vector multiplied by a  $3 \times 3$  matrix takes nine multiplies and six adds. The fixed structure of the last row of Eq. (5.35), however, simplifies the actual operations to

$$\begin{aligned}x' &= x \cdot r_{11} + y \cdot r_{12} + t_x \\y' &= x \cdot r_{21} + y \cdot r_{22} + t_y\end{aligned}\tag{5.36}$$

reducing the process to four multiplies and four adds—a significant speedup, especially since the operation can be applied to hundreds or even thousands of points per picture. Thus, although  $3 \times 3$  matrices are convenient and useful for composing 2D transformations, we can use the final matrix most efficiently in a program by exploiting its special structure. Some hardware matrix multipliers have parallel adders and multipliers, thereby diminishing or removing this concern.

Another area where efficiency is important is creating successive views of an object, such as a molecule or airplane, rotated a few degrees between each successive view. If each view can be created and displayed quickly enough (30 to 100 milliseconds each), then the object will appear to be rotating dynamically. To achieve this speed, we must transform each individual point and line of the object as quickly as possible. The rotation equations (Eq. (5.6)) require four multiplies and two adds. We can decrease the operation count by recognizing that, because  $\theta$  is small (just a few degrees),  $\cos\theta$  is very close to 1. In this approximation, Eq. (5.6) becomes

$$x' = x - y \sin\theta, \quad y' = x \sin\theta + y,\tag{5.37}$$

which requires just two multiplies and two adds. The savings of two multiplies can be significant on computers lacking hardware multipliers.

Equation (5.37), however, is only an approximation to the correct values of  $x'$  and  $y'$ : a small error is built in. Each time the formulae are applied to the new values of  $x$  and  $y$ , the error gets a bit larger. If we repeat the formulae indefinitely, the error will overwhelm the correct values, and the rotating image will begin to look like a collection of randomly drawn lines.

A better approximation is to use  $x'$  instead of  $x$  in the second equation:

$$\begin{aligned}x' &= x - y \sin\theta, \\y' &= x' \sin\theta + y = (x - y \sin\theta)\sin\theta + y = x \sin\theta + y(1 - \sin^2\theta)\end{aligned}\tag{5.38}$$

This is a better approximation than is Eq. (5.37) because the determinant of the corresponding  $2 \times 2$  matrix is 1, which means that the areas transformed by Eq. (5.38) are unchanged. Note that cumulative errors can also arise when using the correct rotation equations repeatedly (see Exercise 5.19).

## 5.6 MATRIX REPRESENTATION OF 3D TRANSFORMATIONS

Just as 2D transformations can be represented by  $3 \times 3$  matrices using homogeneous coordinates, so 3D transformations can be represented by  $4 \times 4$  matrices, providing we use homogeneous coordinate representations of points in 3-space as well. Thus, instead of representing a point as  $(x, y, z)$ , we represent it as  $(x, y, z, W)$ , where two of these



```
void SRGP.setLocatorMeasure (point position);
```

重置定位器的度量 (*position* 部分, 而不是与按键有关的域)。

当定位器处于关闭状态时重置度量, 结果不会立刻在屏幕上反映出来; 但当定位器处于激活状态时重置度量, 会及时改变相应的回应 (如果有的话)。这样, 如果程序中要让光标在定位器激活时位于除中心点以外的其他位置, 必须在调用 `SRGP.setInputMode` 前以所需初始位置调用 `SRGP.setLocatorMeasure` 函数。这一技术通常用于实现光标位置的连续性; 定位器关闭前的最后一个度量被存储起来, 当设备被重新激活时, 光标可以回到该位置。

### 3. 键盘属性和度量控制

定位器回应的是物理设备的运动位置, 而键盘设备的回应是在屏幕上没有确定的位置。因此位置作为键盘设备的属性之一 (默认值与具体实现有关), 可通过调用以下函数设置:

```
void SRGP.setKeyboardEchoOrigin (point origin);
```

当键盘设备关闭时, 键盘的默认度量自动复位为空串。如果在激活键盘前将度量设置为一个非空的初始值, 可以很方便地实现一个默认输入串的显示 (在回应一开始就由 SRGP 显示), 用户可以接受它或在修改后按回车键, 从而减少击键次数。键盘的度量是通过调用以下函数设置的:

```
void SRGP.setKeyboardMeasure (char *measure);
```

## 2.3 光栅图形特性

到现在为止, 我们已经介绍了 SRGP 的大多数特性。这一节将讨论其余的功能, 它们充分利用了光栅显示硬件的优势, 尤其是保存和恢复屏幕中被其他图像 (例如, 窗口或临时菜单) 覆盖区域的能力。这样的图像操作是在窗口管理应用程序和菜单管理应用程序的控制下完成的。我们还引入屏外位图 (称为画布) 来存储窗口和菜单, 并将讨论如何进行矩形框裁剪。

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### 2.3.1 画布

让复杂的图标或菜单快速地显示或消失的最好方法是在内存中创建它们, 然后将它们按需要复制到屏幕上。光栅图形软件包首先在所需尺寸的不可见的屏外位图或像素图 (SRGP 中称为的画布) 中生成图元, 然后将画布复制到显存或从显存中读出。这实际上是一种缓冲技术。使用了我们即将讨论的快速 `SRGP.copyPixel` 操作后, 整块地来回移动像素一般要比重新生成信息更快。

SRGP 画布是一个将图像作为 2D 像素数组存储的数据结构。它也存储一些有关图像大小和属性的控制信息。每个画布在各自的笛卡儿坐标系下显示图像, 这与图 2-1 中所示的屏幕显示相同; 实际上, 屏幕本身就是个画布, 特殊之处仅在于它是惟一被显示的画布。要显示一个存储在屏外的画布上的图像, 应用程序必须将它复制到屏幕画布上。在新图像 (例如菜单) 即将显示的屏幕部分内的图像, 其像素将预先复制到其他屏外画布上存储起来。待菜单选中之后, 这些像素再从画布复制回以恢复原图像。

在任何时候, 只有一个当前活动画布, 新的图元将绘制到这个画布上, 而新的属性设置也将对它生效。该画布可能是屏幕画布 (我们使用的默认画布) 或是一个屏外画布。传给图元过程的坐标是以当前活动画布的局部坐标空间形式表示的。每个画布都有自己完整的 SRGP 属性集, 这些属性影响所有存储在该画布上的图形, 而且当创建画布时, 这些属性被设置为标准的默认值。对属性设置过程的调用仅修改当前活动画布的属性。为方便起见, 可以把画布看成一个虚拟屏幕, 它具有程序指定的尺寸、与自己关联的像素图、坐标系和属性组。画布的这些特性有时也被称为是画布的状态或内容。

当 SRGP 被初始化时, 屏幕画布自动创建并被激活。我们讨论过的所有程序只能在该画布



内生成图元。它是惟一在屏幕上可见的画布，而且其ID是SCREEN\_CANVAS，为SRGP常量。通过调用以下过程可创建一个新的屏外画布，该过程返回分配给新画布的ID：

```
canvasID SRGP.createCanvas (int width, int height);
```

与屏幕类似，新画布的局部坐标系的原点(0,0)在左下角，右上角位于(width-1, height-1)。一个1×1的画布定义的宽和高均为1，它的左下角和右上角均在(0,0)！这与我们对网格交点处的像素的处理相一致：在1×1的画布上的单个像素位于(0,0)。

新创建的画布被自动激活，并且其像素初始化为颜色0（在任何图元显示前，屏幕画布也完成同样操作）。一旦画布被创建，它的尺寸不能再改变。同样，由于SRGP使用的像素的位数与硬件要求一致，所以程序员也不能控制画布中各像素所占的位数。画布的属性作为其“局部”状态信息的一部分被保存；这样，在创建一个新的活动画布之前，程序不需要显式地保存当前活动画布的属性。

应用程序通过调用以下函数选择一个已经创建的画布作为当前活动画布：

```
void SRGP.useCanvas (canvasID id);
```

画布被激活决不意味着该画布变为可见；屏外画布上的图像必须拷贝到屏幕画布上（使用刚才提到的SGRP\_copyPixel过程）才能显示。

可以通过调用以下过程删除画布：

```
void SRGP.deleteCanvas (canvasID id);
```

但该过程不能用来删除屏幕画布或当前活动画布。以下过程允许查询画布的尺寸；其中一个返回定义画布坐标系（左下角点通常为(0,0)）的矩形，另一个将宽和高分别作为独立量返回。

```
rectangle SRGP.inquireCanvasExtent (canvasID id);  
void SRGP.inquireCanvasSize (canvasID id, int *width, int *height);
```

让我们来看如何使用画布实现在图2-22和2.2.6节中提到的高层交互处理程序调用的PerformPulldownMenuInteraction过程。该过程由图2-24给出的伪代码实现，图2-25展示了它的动作序列。每个菜单有各自惟一的ID（由CorrelateMenuBar函数返回），它可用来定位包含以下有关菜单体外观信息的数据库记录：

- 存储菜单体的画布的ID。
- 用屏幕画布坐标来表示的矩形区（伪代码中称为menuBodyScreenExtent），即当用户点击菜单标题下拉菜单时，菜单体的显示区域。

```
int PerformPulldownMenuInteraction (int menuID);  
/* 画布矩形区域的保存/复制在2.3.3节描述 */  
{  
    高光显示菜单条中的菜单头;  
    menuBodyScreenExtent = screen-area 菜单体将要出现的屏幕区域矩形;  
    在临时画布上保存menuBodyScreenExtent的当前像素;  
    /* 参见图2-25a */  
    将菜单体图像从体画布拷贝到menuBodyScreenExtent;  
    /* 参见图2-25b和图2-28中的C代码 */  
    等待按钮弹起，提醒用户作出选择，然后得到定位器的度量；将暂时的画布上所保存  
    的图像拷贝到menuBodyScreenExtent;  
    /* 参见图2-25c */  
}
```

图2-24 PerformPulldownMenuInteraction的伪代码

## 第3章 二维图元的基本光栅图形学算法

光栅图形软件包近似作出数学意义上的（“理想的”）图元，这些图元定义在笛卡儿坐标系的网格点上，用适当灰度或色彩的像素点集来表示。这些像素一般作为位图或像素图存储在CPU内存或帧缓存中。在前一章，我们讨论了图形包SRGP的特点。从应用程序员的角度看，这是一个典型的光栅图形包。在本章，我们则从一个软件包实现者的角度来讨论SRGP，探讨将图元转换到像素的扫描转换算法，即如何根据图元的特点，在一个直立的矩形裁剪框内画出图元。图3-1中所示的是关于图元扫描转换及裁剪的一些例子。

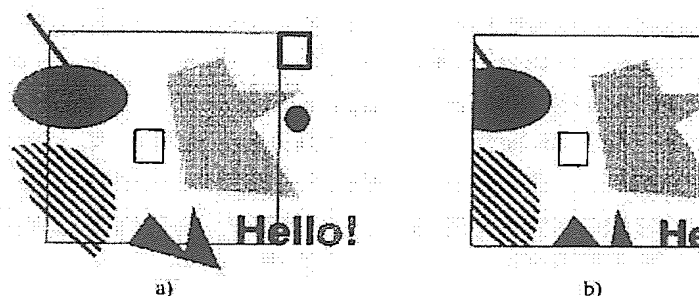


图3-1 在一个矩形裁剪框内裁剪SRGP的图元。a) 图元和裁剪框，b) 裁剪结果

在一些比较成熟和功能强的软件包中，采用了一些高级算法来处理一些SRGP并不支持的操作。这些高级算法将在第19章进行讨论。本章讨论的算法是基于二维整数笛卡儿坐标网格的，而其中大多数扫描转换算法可推广到浮点数的情况，其裁剪算法则可推广到浮点数及三维的情况。本章最后一节讨论反走样的概念，即通过调节像素的灰度来尽可能地消除图元显示时的锯齿状表现。

### 3.1 概述

#### 3.1.1 显示系统体系结构的含义

在1.7节中介绍的基本概念模型中，我们给出了一个图形软件包。它介于应用程序（及其数据结构和模型）和显示硬件之间，以便为应用程序使用硬件提供一个与设备无关的接口。如图3-2所示，SRGP的程序可以分成两部分，一部分是输出流水线，另一部分是输入流水线。

在输出流水线中，应用程序根据应用模型或数据结构中存储的或推导的图元和属性对物体进行描述，并将这些信息传递给图形包，由图形包将它们裁剪和扫描转换为最终在屏幕上显示的像素。图形包中的图元生成程序确定要生成什么图元，其属性程序确定要怎样生成图元。SRGP\_copyPixel程序确定对图像进行怎样的修改，而画布控制程序确定在什么地方生成图像。在输入流水线中，在显示终端的用户交互操作由图形包的采样程序或事件驱动输入程序转换成度量信息，并将这些度量信息传递给应用程序。然后，应用程序根据这些度量信息对模型或者屏幕上的图像进行修改。与输入相关的程序包括：初始化和控制输入设备的程序，以及在交互过程中从输入设备获取度量信息的程序。在本书我们将不讨论SRGP的画布管理和它的输入处理，因为这些内容主要是一些数据结构和底层的系统软件问题，与光栅图形学关系不大。

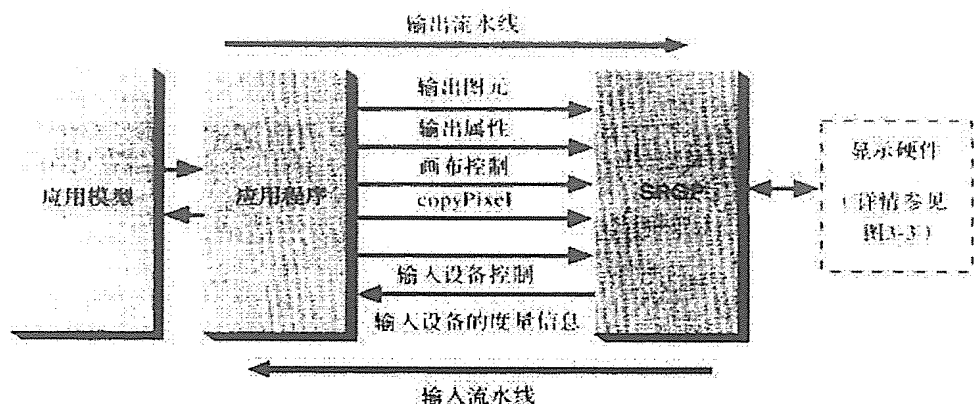


图3-2 作为应用程序和图形系统的中介，SRGP提供了输出流水线和输入流水线

实现一个SRGP图形包必须充分考虑各种显示设备。有些显示系统带有自己的帧缓存和显示控制器，这些显示控制器的工作是解释和执行绘图命令，将生成像素写入帧缓存。另有一些简单的系统只可直接由CPU进行刷新。其图形包的只输出部分可以驱动光栅硬拷贝设备。这些各具特点的硬件体系结构，在第4章和第18章有详细的讨论。在任何一个显示系统中，CPU必须能够对帧缓存中的每个像素进行读写操作。如果能够对帧缓存中的像素进行成块的读写操作，则能很方便地实现copyPixel(bitBlt)类型的操作。这一功能不是为了直接生成图元，而是为了使屏幕画面外的位图或像素图成为可见的，以及在窗口管理、菜单处理、滚动等操作中保留和恢复屏幕上的一些显示片段。

可直接由CPU进行刷新的系统的实现过程基本上是一致的，因为这些刷新工作都是由软件来完成的。然而显示控制器和硬拷贝的系统的实现过程则差别较大，这取决于硬件设备能做哪些工作以及哪些工作要由软件去完成。显然，在任何体系结构中，那些不能由硬件直接支持的图元和特征，必须通过软件进行扫描转换来生成。让我们简单地看一下体系结构及其实现的有关内容。

#### 1. 具有帧缓存和显示控制器的显示器

如果SRGP驱动显示控制器自己能够进行扫描转换并直接处理SRGP的图元和属性，那么SRGP只需做很少的工作。在这种情况下，SRGP只需将它关于图元、属性和写模式的内部表示转换成显示外设能够直接绘图的方式即可（参见图3-3a）。

如果存储映射允许CPU直接访问帧缓存，显示控制器也能直接访问CPU，那么显示控制器的体系结构的功能将是最强的。此时，CPU用其自身的指令就能对单个像素或copyPixel像素块进行读写操作，而显示控制器亦能在屏幕画面外的画布上进行扫描转换，并用它的copyPixel指令在两个存储器之间或它自己的帧缓存内进行像素的传递。当CPU和显示控制器可以异步运行时，则必须具有同步机制以避免存储器读写的冲突。通常，CPU是将显示控制器作为一个协处理器进行管理。如果显示设备的显示控制器只能在它自己的帧缓存中进行扫描转换，而不能将像素写入CPU的内存，则我们要找出一种方法以便在屏幕画面外的画布上生成图元。在这种情况下，图形包可以用显示控制器在屏幕的画布上进行扫描转换，而对于屏幕画面外的画布，就必须用它自身的软件进行扫描转换。当然，图形包可以通过copyPixel操作将硬件数据扫描转换形成的帧缓存中的图像复制到屏幕画面外的画布。

#### 2. 只有帧缓存的显示器

在没有显示控制器时，SRGP就必须自身进行扫描转换以生成屏幕画面外的画布和帧缓存



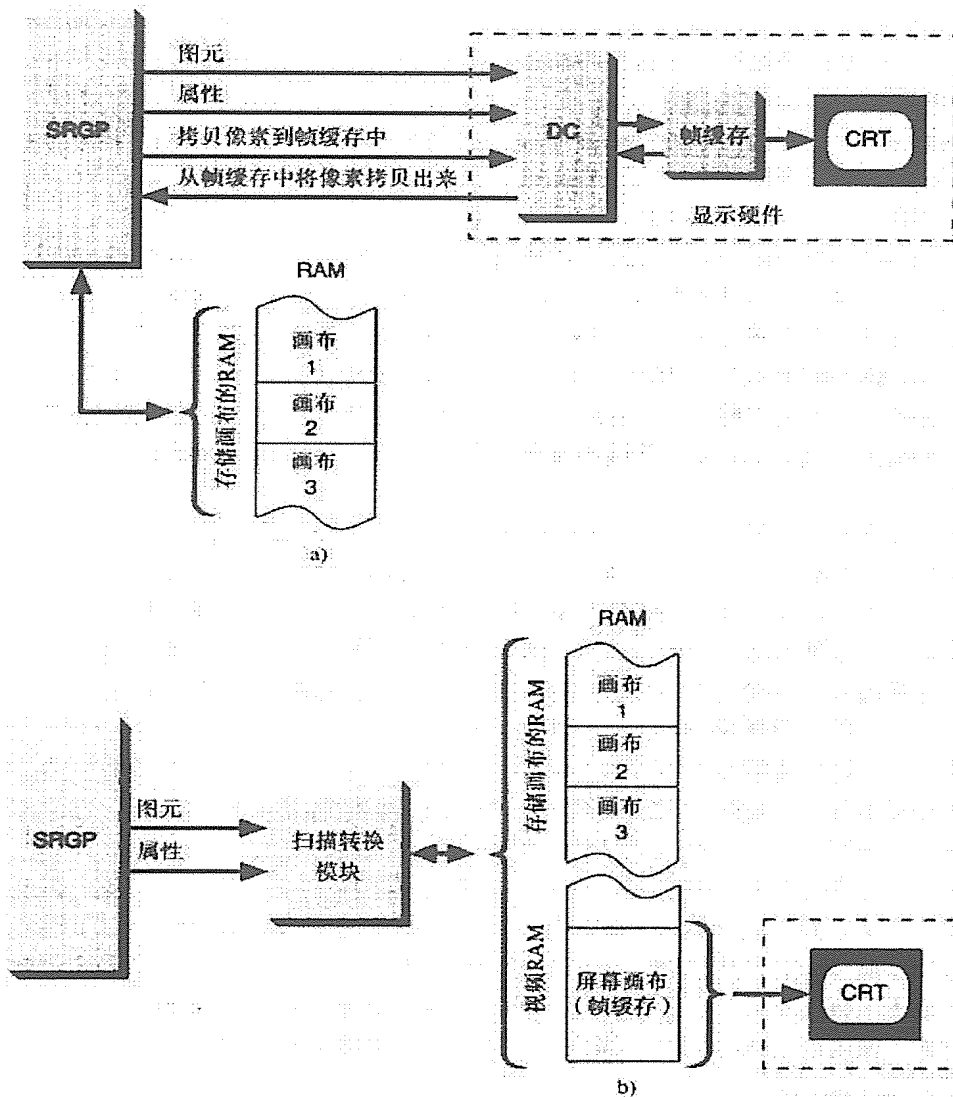


图3-3 SRGP驱动的两显示系统。a) 带有显示控制器和帧缓存的显示外设，b) 无显示控制器，只有存储共享的帧缓存的显示系统

图像。这种情况的一个典型结构如图3-3b所示，SRGP驱动一个存储共享的帧缓存。请注意，图中只给出了那些作为帧缓存和存储由SRGP管理的画布的存储器。另有一些存储器是为一般软件和数据（包括SRGP自身）所用的，则未包括在内。

### 3. 硬拷贝设备

如同在第4章将介绍的那样，具有不同功能的硬拷贝设备多种多样。最简单的设备一次只接受一条扫描线，并且在胶片或纸上绘制时要靠软件来定位扫描线。对于这种简单的硬件，SRGP必须生成完整的位图或像素图，并一次扫描出一条线传递给输出设备。好一点的设备，一次可接受一整页（帧）。而功能更强的设备则自身带有扫描转换硬件，它们通常被称为光栅图像处理器（RIP）。作为最高档的外设，PostScript打印机有自己的内部“引擎”，以读取描述页面的PostScript程序（该描述与设备无关），这些“引擎”能解释这种程序以生成图元和属性，

并随后进行扫描转换。由于基本的裁剪和扫描转换算法在本质上与光栅设备的输出技术无关，因此，我们在本章对各种硬拷贝设备不再做过多的论述。

### 3.1.2 软件中的输出流水线

在此，我们只分析驱动简单帧缓存显示器的输出流水线，只是为了引出用软件进行裁剪和扫描转换的问题。将要介绍的各种算法在讨论时与具体设备无关。因此，它们既可以用于软件实现，也可以用于硬件或微代码实现。

对于SRGP要处理的每个输出图元，图形包都要扫描转换该图元，即根据它们可用的属性和当前的写模式，将相关的像素写入当前画布中。同时，要用裁剪框对图元进行裁剪，即图元中不在裁剪框内的像素将不显示。裁剪的处理有多种方式。一种显而易见的方式是在扫描转换以前进行裁剪，即先解析地计算图元与裁剪框的交点，再根据这些交点生成图元被裁剪后的结果。显然，这种处理方式的好处是：扫描转换操作只需要处理裁剪后的图元，而不是原来的图元（它可能大很多）。这种技术经常用来裁剪线条、矩形和多边形，因为处理它们的裁剪算法相当简单和有效。

最简单的裁剪方式，称为裁剪（scissoring），即对整个图元进行扫描转换，但只显示位于画布上裁剪框内的像素。理论上讲，就是在显示一个像素前将其坐标与裁剪框边界的 $(x, y)$ 坐标区间进行比较。但实际上，正如我们后面将讨论的那样，对一条扫描线上相邻的像素可以避免一些这样的比较。这种剪裁一般是快速进行的。如果边界检查可以快捷地进行（例如，利用微代码或指令高速缓存的一个紧凑工作的内循环），这种方法可能实际上比先裁剪再扫描转换的方法快。它也可以推广到处理任意形状的裁剪区域。

第三种方式就是生成所有的图元并写入一个临时画布中，然后只对在裁剪框内的像素进行复制以送到目标画布中。这种方式既费空间又费时间，但它容易实现，因此，它常用来处理文字。

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每生成一幅图像或修改一幅图像，光栅显示都要调用裁剪和扫描转换算法。因此，裁剪和扫描转换算法不仅要能生成视觉效果好的图像，而且执行还要尽可能地快。在下面各节的详细讨论中，扫描转换算法将运用增量方法来减少每次循环中的计算量（特别是乘法和除法运算），并且其运算是用整数而不是浮点算术运算来进行。在第18章我们还将看到，通过使用多重并行处理器来对整个输出图元或图元的一部分同步地进行扫描转换还将进一步加速其运算。

## 3.2 直线的扫描转换

对直线的扫描转换，就是要在二维光栅格上计算接近或位于理想的无限细的直线上的像素的坐标。理论上，这些像素应尽可能地接近线，并且这些像素的队列要尽可能地直。假设对线近似表达的宽度是一个像素，那么，这样的线会有一些什么样的特点呢？如果线的斜率在1和-1之间（包括1和-1），则每一列上必定只有一个像素被显示；若线的斜率在此范围之外，则每一行上必定只有一个像素被显示。无论长度和方向如何，整条线应该以相同的亮度尽可能快地生成。此外，还要为画线提供其他的功能：所画的线可以宽于一个像素，其宽度相对于理论上的线中心对称；它可以具有不同的线型和笔型，可以具有高质量图形所需的其他效果。例如，在程序员的控制下，端点区域的形状可以是斜的、圆的和勾角的。在每个像素具有多位的显示系统中，运用反走样技术可以加强像素的灰度变化能力，这样，我们就可以尽可能地改善对线进行离散的拟合所产生的锯齿形状。

至此，我们只讨论“最优”线的情况，即每列只显示一个像素的斜线（若是陡的线，则每



行上只有一个像素显示)。在本章后面的部分,我们将讨论宽的图元及其处理方式。

我们知道,为了可视化几何属性,SRGP将一个像素表达成一个圆形的点,并且其中心就是像素在整数栅格上的 $(x, y)$ 坐标。这种表达方式便于拟合CRT电子光束的近似圆形的横截面,但实际显示时,光束斑点之间的间距在不同的系统中变化很大。在有些系统中,相邻的斑点是相重叠的;而另有一些系统中,垂直方向相邻的像素之间不相重叠;在大多数系统中,水平方向上的间距要比垂直方向上的间距小。在不同的系统中,坐标系的表达也有差异,比如在苹果牌Macintosh机器中,像素位于相邻栅格线构成的矩形框内,而不是在栅格线上。这样,在数学上由两个对角点定义的矩形在这种机器上就由此矩形内的所有像素来表示。如此就存在零宽度的画布,比如,由 $(x, y)$ 到 $(x, y)$ 定义的矩形不包含任何像素。而在SRGP中,这个画布会有一个在该点的像素。至此,我们依然将像素表达为不相接的圆,它们的圆心位于栅格点上。只有在讨论反走样时,此定义才略有改变。

图3-4中所画的是放大了很多倍的一条单个像素宽的线和它要拟合的真实的线,实心圆表示被显示的像素,空心圆则表示没有被显示的像素。在真实的屏幕上,圆形像素的直径要大于像素间的间距,所以这种符号表示实际上是夸大了像素的高散性。

因为SRGP的图元是定义在整数栅格上的,所以线的端点是整数坐标。但实际上,若先用一个矩形框裁剪线段,则线段与裁剪边的交点作为裁剪后的端点,其坐标很可能是非整数的。对于浮点数光栅图形包,情况也一样。(在3.2.3节中,我们将讨论非整数交点的情况。)在下面的讨论中,我们将假设线的斜率 $|m| \leq 1$ 。至于其他斜率的情况,只需做适当的调整就可以处理。而对于水平线、垂直线、斜率为 $\pm 1$ 的这些常见的线,只需作为平常的特例处理即可,因为它们只可能穿过像素中心(见习题3.1)。

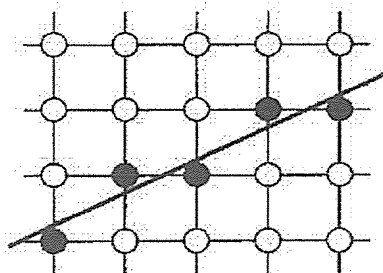


图3-4 实心圆表示扫描转换一条线所显示的像素

### 3.2.1 基本增量算法

对线的扫描转换,最简单的策略就是将斜率 $m$ 计算为 $\Delta y / \Delta x$ ,然后,从最左端的点开始,对 $x$ 每次递增一个单位,而对每个 $x_i$ ,计算其相应的 $y_i = mx_i + B$ ,并显示坐标为 $(x_i, \text{Round}(y_i))$ 的像素,其中, $\text{Round}(y_i) = \text{Floor}(0.5 + y_i)$ (即对 $0.5 + y_i$ 进行取整)。这种计算是为了选择最接近线的像素,即到实际的线距离最短的像素<sup>①</sup>。当然,这种简单的方式并不很有效,因为每次循环都要用浮点(或二进制分数)计算一次乘法、一次加法并调用一次取整运算。我们可以去掉其中的乘法,由于

$$y_{i+1} = mx_{i+1} + B = m(x_i + \Delta x) + B = y_i + m\Delta x$$

当 $\Delta x = 1$ 时, $y_{i+1} = y_i + m$ 。

因此, $x$ 每增加一个单位, $y$ 就加上一个 $m$ , $m$ 是线的斜率。对于线上的所有点 $(x_i, y_i)$ ,我们知道,如果 $x_{i+1} = x_i + 1$ ,那么 $y_{i+1} = y_i + m$ ;也就是说, $x$ 和 $y$ 的值可以根据前一点的值推算出来(见图3-5)。这就是将该方法称为增量算法的原因:在每一步,我们只需根据前一步的结果进行增量计算即可。

增量运算从一个端点的整数坐标 $(x_0, y_0)$ 开始。值得注意的是,增量算法避免了对 $y$ 轴上的

<sup>①</sup> 在第19章,我们将为直线和一般曲线讨论各种度量近似性的方法,也称为误差测量。



## 5.4 窗口到视口的变换

一些图形软件包允许程序员在浮点世界坐标系下指定输出图元的坐标，使用对应用程序有意义的单位：埃，微米，米，英里，光年等等。使用术语“世界”是因为应用程序正在表示一个正在被交互创建或向用户显示的世界。

假定输出图元在世界坐标系下指定，则必须告诉图形子程序包如何将世界坐标系映射到屏幕坐标系（我们使用特殊的术语屏幕坐标以便将这部分与SRGP联系起来，但是因为可能使用硬拷贝输出设备，在这种情况下术语设备坐标更加准确）。我们可以通过由程序员向图形软件包提供变换矩阵来实现这种映射。另一种方式是让程序员在世界坐标中指定一个矩形区域，称为世界坐标系窗口，另外在屏幕坐标上指定一个对应的矩形区域，称为视口，世界坐标系窗口将被映射到视口中。将窗口映射到视口的变换被应用到世界坐标系中的所有输出图元，从而将它们映射到屏幕坐标系中。图5-10显示了这一概念。如图5-10所示，如果窗口和视口高度宽度比不同，就会出现一个非均匀缩放变换。如果应用程序改变窗口或视口，那么新绘制到屏幕上的输出图元会受到变化的影响，而现存的输出图元则不受这种变化的影响。

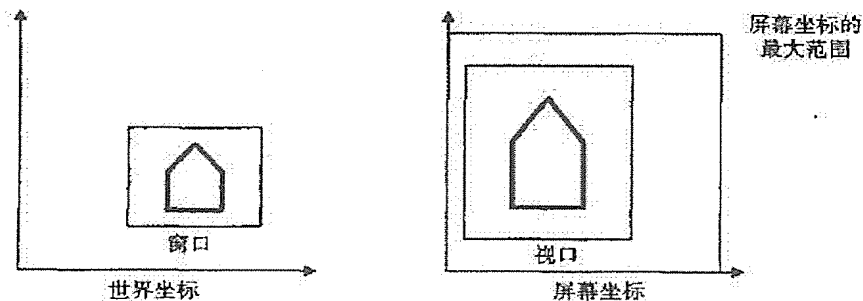


图5-10 世界坐标中的窗口和屏幕坐标中的视口确定了一个映射，该映射作用于世界坐标中的所有图元

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修饰语世界坐标与窗口一起使用，以强调我们不是在讨论一个窗口管理器窗口，后者是一个不同的更新的概念，却不幸具有相同的名字。当不会产生歧义时，我们就丢弃这个修饰语。

如果SRGP提供世界坐标下的输出图元，视口将出现在当前的画布上，默认为画布0，即屏幕。应用程序能够在任何时刻改变窗口或视口，在这种情况下随后指定的输出图元将被施加新的变换。如果这种变化包括一个不同的视口，那么新的输出图元将被定位在画布上不同于原来输出图元的位置上，如图5-11所示。

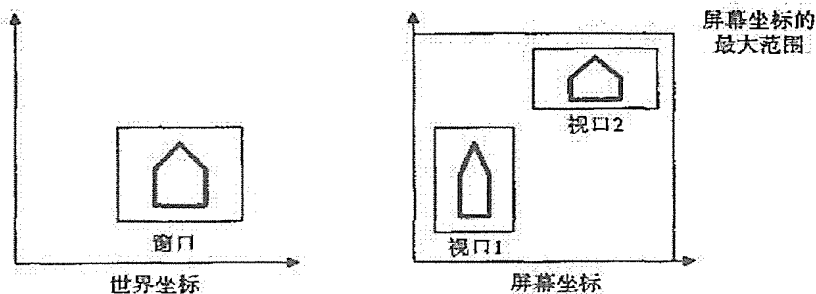


图5-11 以两个视口画输出图元的效果。描述房子的输出图元先被画在视口1，该视口变化成视口2，然后应用程序再次调用软件包来画输出图元



一个窗口管理器可能将SRGP的画布0映射为全屏窗口的一部分，在这种情况下并不是整个画布或者视口都必须可见。在第10章中，我们进一步讨论世界坐标系窗口、视口和窗口管理器窗口三者之间的关系。

给定窗口和视口，什么是将窗口从世界坐标系映射到屏幕坐标系下的视口的变换矩阵？这个矩阵可以由一个三步的变换合成求出，如图5-12所示。首先，用左上和右下角点表示的窗口被平移到世界坐标系的原点。第二步，窗口的尺寸被缩放成与视口尺寸相等。最后，用一个平移变换设置视口的位置。完整的矩阵 $M_{wv}$ 为：

$$\begin{aligned}
 M_{wv} &= T(u_{\min}, v_{\min}) \cdot S\left(\frac{u_{\max} - u_{\min}}{x_{\max} - x_{\min}}, \frac{v_{\max} - v_{\min}}{y_{\max} - y_{\min}}\right) \cdot T(-x_{\min}, -y_{\min}) \\
 &= \begin{bmatrix} 1 & 0 & u_{\min} \\ 0 & 1 & v_{\min} \\ 0 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} \frac{u_{\max} - u_{\min}}{x_{\max} - x_{\min}} & 0 & 0 \\ 0 & \frac{v_{\max} - v_{\min}}{y_{\max} - y_{\min}} & 0 \\ 0 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 & -x_{\min} \\ 0 & 1 & -y_{\min} \\ 0 & 0 & 1 \end{bmatrix} \\
 &= \begin{bmatrix} \frac{u_{\max} - u_{\min}}{x_{\max} - x_{\min}} & 0 & -x_{\min} \cdot \frac{u_{\max} - u_{\min}}{x_{\max} - x_{\min}} + u_{\min} \\ 0 & \frac{v_{\max} - v_{\min}}{y_{\max} - y_{\min}} & -y_{\min} \cdot \frac{v_{\max} - v_{\min}}{y_{\max} - y_{\min}} + v_{\min} \\ 0 & 0 & 1 \end{bmatrix} \quad (5-33)
 \end{aligned}$$

乘法 $P = M_{wv}[x \ y \ 1]^T$ 给出期望的结果：

$$P = \begin{bmatrix} (x - x_{\min}) \cdot \frac{u_{\max} - u_{\min}}{x_{\max} - x_{\min}} + u_{\min} & (y - y_{\min}) \cdot \frac{v_{\max} - v_{\min}}{y_{\max} - y_{\min}} + v_{\min} & 1 \end{bmatrix} \quad (5-34)$$

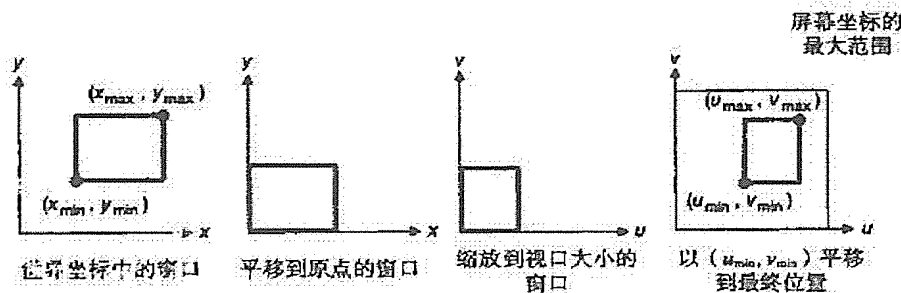


图5-12 变换世界坐标窗口到视口的步骤

许多图形软件包将窗口-视口变换与用窗口对输出图元的裁剪结合起来。裁剪的概念在第3章已经介绍过；图5-13显示了在窗口和视口环境(context)下的剪裁。

## 5.5 效率

R、S和T操作最普通的合成产生

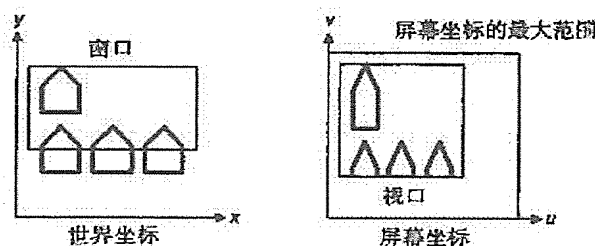


图5-13 世界坐标中的输出图元被窗口裁剪。保留的部分被显示在视口中

Doc Code: PET.AUTO

PageID #: 4358

Document Description: Petition automatically granted by EFS-Web

U.S. Patent and Trademark Office  
Department of Commerce

Electronic Petition Request	<b>PETITION TO WITHDRAW AN APPLICATION FROM ISSUE AFTER PAYMENT OF THE ISSUE FEE UNDER 37 CFR 1.313(c)</b>
Application Number	16852790
Filing Date	20-Apr-2020
First Named Inventor	Koen Beel
Art Unit	2184
Examiner Name	
Attorney Docket Number	21063.0005USC1
Title	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

An application may be withdrawn from issue for further action upon petition by the applicant. To request that the Office withdraw an application from issue, applicant must file a petition under this section including the fee set forth in § 1.17(h) and a showing of good and sufficient reasons why withdrawal of the application from issue is necessary.

APPLICANT HEREBY PETITIONS TO WITHDRAW THIS APPLICATION FROM ISSUE UNDER 37 CFR 1.313(c).

A grantable petition requires the following items:

- (1) Petition fee; and
- (2) One of the following reasons:
  - (a) Unpatentability of one or more claims, which must be accompanied by an unequivocal statement that one or more claims are unpatentable, an amendment to such claim or claims, and an explanation as to how the amendment causes such claim or claims to be patentable;
  - (b) Consideration of a request for continued examination in compliance with § 1.114 (for a utility or plant application only); or
  - (c) Express abandonment of the application. Such express abandonment may be in favor of a continuing application, but not a CPA under 37 CFR 1.53(d).

#### Petition Fee

☐ Small Entity

☐ Micro Entity

☒ Regular Undiscounted

Reason for withdrawal from issue

- ☐ One or more claims are unpatentable
- ☒ Consideration of a request for continued examination (RCE) (List of Required Documents and Fees)
- ☐ Applicant hereby expressly abandons the instant application (any attorney/agent signing for this reason must have power of attorney pursuant to 37 CFR 1.32(b)).

RCE request, submission, and fee.

- ☐ I certify, in accordance with 37 CFR 1.4(d)(4) that :
- ☐ The RCE request ,submission, and fee have already been filed in the above-identified application on
- ☒ Are attached.

THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:

- ☒ An attorney or agent registered to practice before the Patent and Trademark Office who has been given power of attorney in this application.
- ☐ An attorney or agent registered to practice before the Patent and Trademark Office, acting in a representative capacity.
- ☐ A sole inventor
- ☐ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application
- ☐ A joint inventor; all of whom are signing this e-petition

Signature	/Thomas Lee/
Name	Thomas Lee
Registration Number	66396

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	16852790			
<b>Filing Date:</b>	20-Apr-2020			
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS			
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel			
<b>Filer:</b>	Thomas Lee			
<b>Attorney Docket Number:</b>	21063.0005USC1			
Filed as Large Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
PETITION FEE- 37 CFR 1.17(H) (GROUP III)	1464	1	140	140
RCE- 1ST REQUEST	1801	1	1360	1360
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1500

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Commissioner for Patents  
United States Patent and Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

Decision Date : March 17, 2022

In re Application of :

Koen Simon Herman Beel

DECISION ON PETITION

UNDER CFR 1.313(c)(2)

Application No : 16852790

Filed : 20-Apr-2020

Attorney Docket No : 21063.0005USC1

This is an electronic decision on the petition under 37 CFR 1.313(c)(2), filed March 17, 2022 , to withdraw the above-identified application from issue after payment of the issue fee.

The petition is **GRANTED**.

The above-identified application is withdrawn from issue for consideration of a submission under 37 CFR 1.114 (request for continued examination). See 37 CFR 1.313(c)(2).

**Petitioner is advised that the issue fee paid in this application cannot be refunded. If, however, this application is again allowed, petitioner may request that it be applied towards the issue fee required by the new Notice of Allowance.**

Telephone inquiries concerning this decision should be directed to the Patent Electronic Business Center (EBC) at 866-217-9197.

This application file is being referred to Technology Center AU 2184 for processing of the request for continuing examination under 37 CFR 1.114 .

Office of Petitions

**Electronic Acknowledgement Receipt**

<b>EFS ID:</b>	45250550
<b>Application Number:</b>	16852790
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5321
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel
<b>Customer Number:</b>	52835
<b>Filer:</b>	Thomas Lee
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	21063.0005USC1
<b>Receipt Date:</b>	17-MAR-2022
<b>Filing Date:</b>	20-APR-2020
<b>Time Stamp:</b>	12:42:04
<b>Application Type:</b>	Utility under 35 USC 111(a)

**Payment information:**

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$ 1500
RAM confirmation Number	E20223GC41573263
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:



**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Quick Path Information Disclosure Statement	QPIDS_0005USC1.pdf	364404	no	2
			882af274236b3eca0727d2a89598054c3f4acd72		
Warnings:					
Information:					
2	Request for Continued Examination (RCE)	RCE_0005USC1.pdf	1667144	no	3
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Warnings:					
Information:					
3	Quick Path Information Disclosure Statement	SB08_0005USC1.pdf	1263566	no	4
			3045e194efb2638bdb135f752f5bc539e3e9ad6d		
Warnings:					
Information:					
4	Other reference-Patent/Application/ Search Documents	FR1_JP2004112638A_.pdf	17576310	no	31
			4b08b11f98fe60f023a956507ea8b1c9f681b729		
Warnings:					
Information:					
5	Other reference-Patent/Application/ Search Documents	FR2_JP07123384A_.pdf	16078650	no	26
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6	Other reference-Patent/Application/ Search Documents	FR3_CN101009806A_.pdf	11989123	no	49
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Warnings:					
Information:					

7	Other reference-Patent/Application/ Search Documents	FR4_CN101542459A_.pdf	15675479 5c9a3fe3c0e84fceb24133a378d73b1d5b 31c07	no	72
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<b>Information:</b>					
9	Other reference-Patent/Application/ Search Documents	NP1_Computer_Graphic.pdf	7579957 1cc5525f1a2bbddcb3df141ff6a0193a1e3e 168a	no	27
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11	Fee Worksheet (SB06)	fee-info.pdf	40323 8137e1be92188058b01c5790f2be65d22ec 8fe10	no	2
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<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			84143881		

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

Doc Code: QPIDS.REQ

Document Description: Quick Path Information Disclosure Statement

PTO/SB/09 (12-16)

**CERTIFICATION AND REQUEST FOR CONSIDERATION OF AN INFORMATION DISCLOSURE  
STATEMENT FILED AFTER PAYMENT OF THE ISSUE FEE UNDER THE QPIDS PILOT PROGRAM**

Non-Provisional Application Number: <b>16/852790</b>	Filing Date: <b>2020-04-20</b>
First Named Inventor: <b>Koen Simon Herman BEEL</b>	Title of Invention: <b>ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS</b>

**THE UNDERSIGNED HEREBY CERTIFIES AND REQUESTS THE FOLLOWING FOR THE ABOVE-IDENTIFIED APPLICATION.**

- Consideration is requested of the information disclosure statement (IDS) submitted herewith, which is being filed after payment of the issue fee.
- Check the box next to the appropriate selection:
 

☒ Each item of information contained in the IDS was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the IDS. See 37 CFR 1.97(e)(1).

**OR**

☐ No item of information contained in the IDS was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the IDS was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the IDS. See 37 CFR 1.97(e)(2).

**OR**

☐ See attached certification statement in compliance with 37 CFR 1.97(e).
- Please charge the IDS fee set forth in 37 CFR 1.17(p) to Deposit Account No. 503478.
- A Petition to Withdraw from Issue After Payment of the Issue Fee (37 CFR 1.313(c)(2)), including the petition fee set forth in 37 CFR 1.17(h), is submitted herewith as a **Web-based ePetition**.  
**WARNING:** Do not submit the petition as a follow-on paper via EFS-Web. Submit the petition as a Web-based ePetition by signing on to EFS-Web as a registered user, selecting the radio button next to "Existing application/patent," and then selecting the radio button next to "ePetition (for automatic processing and immediate grant, if all petitions requirements are met)." Failure to use the Web-based ePetition interface will result in automatic entry of the RCE.
- A request for continued examination (RCE) under 37 CFR 1.114 and the RCE fee under 37 CFR 1.17(e) are submitted herewith.
- The RCE will be treated as a "conditional" RCE. In the event the examiner determines that any item of information contained in the IDS necessitates the reopening of prosecution in the application, the undersigned understands that (i) the RCE will be processed and treated as an RCE under 37 CFR 1.114 and therefore (ii) the IDS fee under 37 CFR 1.17(p) will be returned in accordance with 37 CFR 1.97(b)(4). In the event that no item of information in the IDS necessitates reopening prosecution, the undersigned understands that the RCE will not be processed and the RCE fee under 37 CFR 1.17(e) will be returned.
- This certification and request is being filed as a **Web-based ePetition** and is not accompanied by an amendment to the application. Inclusion of an amendment will result in automatic entry of the RCE.

Signature <u>/Thomas Lee/</u>	Date <b>March 17, 2022</b>
Name (Print/Typed) <b>THOMAS LEE</b>	Practitioner Registration Number <b>66396</b> (If applicable)
<p><b>Note:</b> Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below.*</p>	
<p><input type="checkbox"/> *Total of _____ forms are submitted.</p>	

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2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
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**United States Patent and Trademark Office***Office of the Chief Financial Officer*

Document Code:WFEE

User :75381

Sale Accounting Date:03/21/2022

Sale Item Reference Number

16852790

Effective Date

03/17/2022

Document Number

I20223KC55170914

Fee Code

1806

Fee Code Description

SUBMISSION- INFORMATION  
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Amount Paid

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Deposit Account

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United States Patent and Trademark Office

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/852,790	04/20/2020	Koen Simon Herman Beel	21063.0005USC1	5321
52835	7590	03/31/2022		
HAMRE, SCHUMANN, MUELLER & LARSON, P.C. 45 South Seventh Street Suite 2700 Minneapolis, MN 55402-1683			EXAMINER BARTELS, CHRISTOPHER A.	
			ART UNIT	PAPER NUMBER
			2184	
			NOTIFICATION DATE	DELIVERY MODE
			03/31/2022	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com



<b>Corrected</b> <b>Notice of Allowability</b>	<b>Application No.</b> 16/852,790	<b>Applicant(s)</b> Beel et al.	
	<b>Examiner</b> CHRISTOPHER A BARTELS	<b>Art Unit</b> 2184	<b>AIA (FITF) Status</b> No

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 03/17/2022.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 82-101. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a) ☐ All      b) ☐ Some\*      c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.  
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. <input type="checkbox"/> Notice of References Cited (PTO-892)	5. <input type="checkbox"/> Examiner's Amendment/Comment
2. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>03/17/2022</u> .	6. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance
3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.	7. <input type="checkbox"/> Other _____.
4. <input type="checkbox"/> Interview Summary (PTO-413), Paper No./Mail Date. _____.	

/C.A.B/ Examiner, Art Unit 2184	/HENRY TSAI/ Supervisory Patent Examiner, Art Unit 2184
------------------------------------	--

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PageID #: 4372

PTO/SB/08a (01-22)

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		16852790
	Filing Date		2020-04-20
	First Named Inventor	BEEL	
	Art Unit	2184	
	Examiner Name	BARTELS	
	Attorney Docket Number	21063.0005USC1	

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Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
/C.A.B/	1	5897644	A	1999-04-27	Nielsen	

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/C.A.B/	1	2004112638	JP	A	2004-04-08		With English machine translation	×
/C.A.B/	2	H07123384	JP	A	1995-05-12		With English machine translation	☒
/C.A.B/	3	101009806	CN	A	2007-08-01		With English machine translation	☒

Application Number  
PageID #: 4373

16852790

Filing Date

2020-04-20

First Named Inventor

BEEL

Art Unit

2184

Examiner Name

BARTELS

Attorney Docket Number

21063.0005USC1

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/C.A.B/	4	101542459	CN	A	2009-09-23		With English machine translation	<input checked="" type="checkbox"/>
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/C.A.B/	1	Foley et al., "Computer Graphics, Principles and Practice Second Edition in C", 1996, with English translation	<input checked="" type="checkbox"/>

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Examiner Signature	/CHRISTOPHER A BARTELS/	Date Considered	03/26/2022
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<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	BEEL
Art Unit	2184
Examiner Name	BARTELS
Attorney Docket Number	21063.0005USC1

**INFORMATION DISCLOSURE  
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**OR**

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-03-17
Name/Print	Thomas Lee	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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03/17/2022	16852790	\$1,360.00

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	16852790
	Filing Date	2020-04-20
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	BARTELS, CHRISTOPHER A.
	Attorney Docket Number	21063.0005USC1

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Application Number  
PageID #: 4379

16852790

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

BARTELS, CHRISTOPHER A.

Attorney Docket Number

21063.0005USC1

**INFORMATION DISCLOSURE  
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Office Action issued in the related U.S. Patent Application No. 16/990215, March 31, 2022, 89 pages

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Application Number  
PageID #: 4380

16852790

**INFORMATION DISCLOSURE  
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Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	BARTELS, CHRISTOPHER A.
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Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-04-05
Name/Print	Thomas Lee	Registration Number	66396

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8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PTO/SB/133 (05-18)

**PATENT TERM ADJUSTMENT  
STATEMENT UNDER 37 CFR 1.704(d)**

Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	BARTELS, CHRISTOPHER A.
Practitioner Docket No.	21063.0005USC1

**APPLICANT HEREBY STATES THE FOLLOWING (please review 37 CFR 1.704(d) before filing this form):**

☐ Each item of information contained in the information disclosure statement was first cited in any communication from a patent office in a counterpart foreign or international application or from the Office, and this communication was not received by any individual designated in 37 CFR 1.56(c) more than thirty days prior to the filing of the information disclosure statement.

**AND/OR**

☒ Each item of information contained in the information disclosure statement is a communication that was issued by a patent office in a counterpart foreign or international application or by the Office, and this communication was not received by any individual designated in 37 CFR 1.56(c) more than thirty days prior to the filing of the information disclosure statement.

**INSTRUCTIONS:**

- **This form will not satisfy the requirement of 37 CFR 1.97(e).** The present statement is filed under 37 CFR 1.704(d) and will not substitute for compliance with any of the requirements of 37 CFR 1.97 and 1.98. For an information disclosure statement to comply with 37 CFR 1.97(c) or (d), the information disclosure statement must be accompanied by a statement under 37 CFR 1.97(e) notwithstanding any statement filed under 37 CFR 1.704(d).
- The present form (PTO/SB/133) should be filed concurrently with the information disclosure statement to derive benefit under 37 CFR 1.704(d).

Signature	/Thomas Lee/	Date	2022-04-05
Typed or Printed Name	Thomas Lee	Practitioner Registration Number	66396
<p><b>Note:</b> Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below*.</p>			
<input type="checkbox"/>	*Total of _____ forms are submitted.		

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

## Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	16852790			
<b>Filing Date:</b>	20-Apr-2020			
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS			
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel			
<b>Filer:</b>	Thomas Lee			
<b>Attorney Docket Number:</b>	21063.0005USC1			
Filed as Large Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
PETITION FEE- 37 CFR 1.17(H) (GROUP III)	1464	1	140	140
RCE- 2ND AND SUBSEQUENT REQUEST	1820	1	2000	2000
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				



Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				2140

UNITED STATES PATENT AND TRADEMARK OFFICE

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Commissioner for Patents  
United States Patent and Trademark Office  
P.O. Box 1450  
Alexandria, VA 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

Decision Date : April 5, 2022

In re Application of :

Koen Simon Herman Beel

DECISION ON PETITION

UNDER CFR 1.313(c)(2)

Application No : 16852790

Filed : 20-Apr-2020

Attorney Docket No : 21063.0005USC1

This is an electronic decision on the petition under 37 CFR 1.313(c)(2), filed April 5, 2022 , to withdraw the above-identified application from issue after payment of the issue fee.

The petition is **GRANTED**.

The above-identified application is withdrawn from issue for consideration of a submission under 37 CFR 1.114 (request for continued examination). See 37 CFR 1.313(c)(2).

**Petitioner is advised that the issue fee paid in this application cannot be refunded. If, however, this application is again allowed, petitioner may request that it be applied towards the issue fee required by the new Notice of Allowance.**

Telephone inquiries concerning this decision should be directed to the Patent Electronic Business Center (EBC) at 866-217-9197.

This application file is being referred to Technology Center AU 2184 for processing of the request for continuing examination under 37 CFR 1.114 .

Office of Petitions

**Electronic Acknowledgement Receipt**

<b>EFS ID:</b>	45402246
<b>Application Number:</b>	16852790
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5321
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel
<b>Customer Number:</b>	52835
<b>Filer:</b>	Thomas Lee
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	21063.0005USC1
<b>Receipt Date:</b>	05-APR-2022
<b>Filing Date:</b>	20-APR-2020
<b>Time Stamp:</b>	17:33:59
<b>Application Type:</b>	Utility under 35 USC 111(a)

**Payment information:**

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$2140
RAM confirmation Number	E202245H33542605
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	ePetition Request Form	petition-request.pdf	39850	no	2
			57d0a1c6207ba26d062db61fa0c3fed4529bb1cf		
Warnings:					
Information:					
2	Quick Path Information Disclosure Statement	QPIDS_0005USC1.pdf	196670	no	2
			7215555291e778b3de5177e0d7f91f615a7e9b7f		
Warnings:					
Information:					
3	Request for Continued Examination (RCE)	RCE_0005USC1.pdf	1349997	no	3
			31aaa6bfeb28dcf1c10716f6953a211ff6f12ef6		
Warnings:					
Information:					
4	Information Disclosure Statement (IDS) Form (SB08)	IDS_US_Form_SB08_0005USC1.pdf	1263303	no	4
			6895f25a15c96d1d00401198e413b64c72e19e1d		
Warnings:					
Information:					
A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
5	Non Patent Literature	OA_US16990215_210630004USC4.pdf	5229319	no	89
			6197f3ed9114eb6772573965ae9e68337a102a92		
Warnings:					
Information:					

6	Quick Path Information Disclosure Statement	30-Day_Statement_0005USC1.pdf	293084 efee7e707ae67bc3486131af3fd31de27c48d49	no	2
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**Warnings:**

**Information:**

7	Fee Worksheet (SB06)	fee-info.pdf	40465 08c250ff4289c087cb32ea7a745d68813f66c8ee	no	2
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**Warnings:**

**Information:**

<b>Total Files Size (in bytes):</b>			8412688		
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**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

Doc Code: PET.AUTO

Document Description: Petition automatically granted by EFS-Web

U.S. Patent and Trademark Office  
Department of Commerce

Electronic Petition Request	<b>PETITION TO WITHDRAW AN APPLICATION FROM ISSUE AFTER PAYMENT OF THE ISSUE FEE UNDER 37 CFR 1.313(c)</b>
Application Number	16852790
Filing Date	20-Apr-2020
First Named Inventor	Koen Beel
Art Unit	2184
Examiner Name	
Attorney Docket Number	21063.0005USC1
Title	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

An application may be withdrawn from issue for further action upon petition by the applicant. To request that the Office withdraw an application from issue, applicant must file a petition under this section including the fee set forth in § 1.17(h) and a showing of good and sufficient reasons why withdrawal of the application from issue is necessary.

APPLICANT HEREBY PETITIONS TO WITHDRAW THIS APPLICATION FROM ISSUE UNDER 37 CFR 1.313(c).

A grantable petition requires the following items:

- (1) Petition fee; and
- (2) One of the following reasons:
  - (a) Unpatentability of one or more claims, which must be accompanied by an unequivocal statement that one or more claims are unpatentable, an amendment to such claim or claims, and an explanation as to how the amendment causes such claim or claims to be patentable;
  - (b) Consideration of a request for continued examination in compliance with § 1.114 (for a utility or plant application only); or
  - (c) Express abandonment of the application. Such express abandonment may be in favor of a continuing application, but not a CPA under 37 CFR 1.53(d).

#### Petition Fee

☐ Small Entity

☐ Micro Entity

☒ Regular Undiscounted

Reason for withdrawal from issue

- ☐ One or more claims are unpatentable
- ☒ Consideration of a request for continued examination (RCE) (List of Required Documents and Fees)
- ☐ Applicant hereby expressly abandons the instant application (any attorney/agent signing for this reason must have power of attorney pursuant to 37 CFR 1.32(b)).

RCE request, submission, and fee.

- ☐ I certify, in accordance with 37 CFR 1.4(d)(4) that :
- ☐ The RCE request ,submission, and fee have already been filed in the above-identified application on
- ☒ Are attached.

THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:

- ☒ An attorney or agent registered to practice before the Patent and Trademark Office who has been given power of attorney in this application.
- ☐ An attorney or agent registered to practice before the Patent and Trademark Office, acting in a representative capacity.
- ☐ A sole inventor
- ☐ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application
- ☐ A joint inventor; all of whom are signing this e-petition

Signature	/Thomas Lee/
Name	Thomas Lee
Registration Number	66396



Doc Code: QPIDS.REQ

Document Description: QuickPath Information Disclosure Statement

PTO/SB/09 (09-18)

**CERTIFICATION AND REQUEST FOR CONSIDERATION OF AN INFORMATION DISCLOSURE STATEMENT FILED AFTER PAYMENT OF THE ISSUE FEE UNDER THE QPIDS PROGRAM**

Non-Provisional Application Number:

16/852790

Filing Date:

2020-04-20

First Named Inventor:

Koen Simon Herman BEEL

Title of Invention:

ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

**THE UNDERSIGNED HEREBY CERTIFIES AND REQUESTS THE FOLLOWING FOR THE ABOVE-IDENTIFIED APPLICATION.**

- Consideration is requested of the information disclosure statement (IDS) submitted herewith, which is being filed after payment of the issue fee.
- Check the box next to the appropriate selection:
 

☐ Each item of information contained in the IDS was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the IDS. See 37 CFR 1.97(e)(1).

**OR**

☒ No item of information contained in the IDS was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the IDS was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the IDS. See 37 CFR 1.97(e)(2).

**OR**

☐ See attached certification statement in compliance with 37 CFR 1.97(e).
- Please charge the IDS fee set forth in 37 CFR 1.17(p) to Deposit Account No. 503478.
- A Petition to Withdraw from Issue After Payment of the Issue Fee (37 CFR 1.313(c)(2)), including the petition fee set forth in 37 CFR 1.17(h), is submitted herewith as a **Web-based ePetition**.  
**WARNING:** Do not submit the petition as a follow-on paper via EFS-Web. Submit the petition as a Web-based ePetition by signing on to EFS-Web as a registered user, selecting the radio button next to "Existing application/patent," and then selecting the radio button next to "ePetition (for automatic processing and immediate grant, if all petitions requirements are met)." Failure to use the Web-based ePetition interface will result in automatic entry of the RCE.
- A request for continued examination (RCE) under 37 CFR 1.114 and the RCE fee under 37 CFR 1.17(e) are submitted herewith.
- The RCE will be treated as a "conditional" RCE. In the event the examiner determines that any item of information contained in the IDS necessitates the reopening of prosecution in the application, the undersigned understands that (i) the RCE will be processed and treated as an RCE under 37 CFR 1.114 and therefore (ii) the IDS fee under 37 CFR 1.17(p) will be returned in accordance with 37 CFR 1.97(b)(4). In the event that no item of information in the IDS necessitates reopening prosecution, the undersigned understands that the RCE will not be processed and the RCE fee under 37 CFR 1.17(e) will be returned.
- This certification and request is being filed as a **Web-based ePetition** and is not accompanied by an amendment to the application. Inclusion of an amendment will result in automatic entry of the RCE.

Signature /Thomas Lee/Date April 5, 2022

Name

(Print/Typed)

Thomas Lee

Practitioner

Registration Number

(If applicable)

66396

**Note:** Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below.\*



\*Total of \_\_\_\_\_ forms are submitted.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

## Privacy Act Statement

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The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**United States Patent and Trademark Office***Office of the Chief Financial Officer*

Document Code:WFEE

User :75381

Sale Accounting Date:04/07/2022

Sale Item Reference Number

16852790

Effective Date

04/05/2022

Document Number

I202247635382177

Fee Code

1806

Fee Code Description

SUBMISSION- INFORMATION  
DISCLOSURE STMT

Amount Paid

\$260.00

Payment Method

Deposit Account



UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/852,790	04/20/2020	Koen Simon Herman Beel	21063.0005USC1	5321
52835	7590	05/11/2022		
HAMRE, SCHUMANN, MUELLER & LARSON, P.C. 45 South Seventh Street Suite 2700 Minneapolis, MN 55402-1683			EXAMINER BARTELS, CHRISTOPHER A.	
			ART UNIT	PAPER NUMBER
			2184	
			NOTIFICATION DATE	DELIVERY MODE
			05/11/2022	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com

<b>Corrected</b> <b>Notice of Allowability</b>	<b>Application No.</b> 16/852,790	<b>Applicant(s)</b> Beel et al.	
	<b>Examiner</b> CHRISTOPHER A BARTELS	<b>Art Unit</b> 2184	<b>AIA (FITF) Status</b> No

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 04/05/2022.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 82-101. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a) ☐ All      b) ☐ Some\*      c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.  
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. <input type="checkbox"/> Notice of References Cited (PTO-892) 2. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>04/05/2022</u> . 3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material _____. 4. <input type="checkbox"/> Interview Summary (PTO-413), Paper No./Mail Date. _____.	5. <input type="checkbox"/> Examiner's Amendment/Comment 6. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance 7. <input type="checkbox"/> Other _____.
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/C.A.B/ Examiner, Art Unit 2184	/HENRY TSAI/ Supervisory Patent Examiner, Art Unit 2184
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## PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	2	"20130198311"	(US-PGPUB; USPAT)	OR	ON	ON	2022/04/24 11:21 PM
L2	3	"16844995"	(US-PGPUB; USPAT)	OR	ON	ON	2022/04/25 09:50 AM
L3	1	"15931825"	(US-PGPUB; USPAT)	OR	ON	ON	2022/04/25 05:51 PM
L4	1	"17061357"	(US-PGPUB; USPAT)	OR	ON	ON	2022/04/26 02:00 PM
L5	106	("20100066806" "20070206088" "20040012669" "2010079783" "20050036509" "2006010116" "5601067" "7584313" "7762470" "8069465" "8327410" "8521926" "8601470" "8717599" "889656" "20030120849" "20060233191" "20070162661" "20080088634" "20080182518" "20090023475" "20090029647" "20090251621" "20100022274" "20100077021" "20100091987" "20100115145" "20100154014" "20100297964" "20100309896" "2011001047" "20110010607" "20110038005" "20110210983" "20110179182" "2005015719" "20090092198" "20050122392" "2009300520" "20120054372" "20090189981" "20110188391" "20100064063" "20110092198" "20060010116" "20070168481" "20020054044" "5966035" "5316138"	(US-PGPUB; USPAT)	OR	ON	ON	2022/04/26 07:52 PM

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**PE2E SEARCH - Search History (Interference)**

There are no Interference searches to show.

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PageID #: 4401

PTO/SB/08a (01-22)

Approved for use through 05/31/2024. OMB 0651-0031

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Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	BARTELS, CHRISTOPHER A.
Attorney Docket Number	21063.0005USC1

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**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	16852790
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Attorney Docket Number	21063.0005USC1

/C.A.B/ 1	Office Action issued in the related U.S. Patent Application No. 16/990215, March 31, 2022, 89 pages
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Application Number  
PageID #: 4403

16852790

Filing Date

2020-04-20

First Named Inventor

Koen Simon Herman BEEL

Art Unit

2184

Examiner Name

BARTELS, CHRISTOPHER A.

Attorney Docket Number

21063.0005USC1

**INFORMATION DISCLOSURE  
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- ☒ See attached certification statement.
- ☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

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A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-04-05
Name/Print	Thomas Lee	Registration Number	66396

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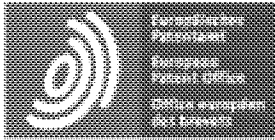
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Sale Adjustment Accounting Date:05/18/2022

Effective Date	Sale Accounting Date	Sale Item Reference Number
04/05/2022	05/18/2022	16852790

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## DESCRIPTION CN202334692U

*10* A USB digital fax machine with camera

[0001]

*14* technical field

[0002]

*18* The utility model relates to a facsimile machine, in particular to a USB digital facsimile machine with a camera and a camera.

[0003]

*23* Background technique

[0004]

*27* At present, fax machines on the market can be divided into paper fax machines and digital fax machines; paper fax machines need to use paper as a medium for sending and receiving, and also need to be equipped with scanners and other equipment, which is costly and consumes a lot of paper.

*30* But ordinary digital fax machines have no camera scanning function. If you want to fax documents such as bills and contracts, you need to configure a scanner or other external auxiliary equipment, and you need to have proprietary software on the computer, which is inconvenient to use; and Some digital fax machines use serial ports for data transmission, and the transmission speed is low.

[0005]

*37* Utility model content

[0006]

41 In view of the deficiencies of the prior art, the utility model perfectly combines the camera function and the digital fax function. For the handwritten bills, contracts, etc. to be faxed, the camera can scan the fax machine to the computer, and the computer software can simply operate the computer. Send them out in fax format, easy to use.

[0007]

48 In order to achieve the above object, the utility model adopts the following technical solutions:

[0008]

52 A USB digital facsimile machine with a camera, comprising a facsimile device, characterized in that: the facsimile device is provided with a digital camera module, a PC is respectively connected with the digital camera module and the facsimile device, and image data is collected by the digital camera module and processed by the PC Then input it to the fax device for transmission.

[0009]

59 The facsimile device includes an MCU, which is a single-chip microcomputer, and the single-chip computer is communicated and connected with the PC via a USB module.

[0010]

64 The single-chip microcomputer communicates with the Modem chip, and is used for faxing and sending the picture files processed by the PC.

[0011]

69 The digital camera module is connected with the PC via the USB module.

[0012]

73 The HID data communication is between the PC, the digital camera module and the single-chip microcomputer.

[0013]

78 Using the USB digital fax machine with camera after the above scheme is adopted, the data to be faxed is placed under the digital camera of the fax machine, the camera collects image data and transmits it to the computer

through the USB cable, and the user automatically converts the image to be faxed through the computer software. It is the file format of facsimile, and the data is transmitted to the facsimile equipment through the USB cable, and the facsimile equipment automatically transmits the data; the utility model perfectly combines the camera function and the digital facsimile function, and is suitable for faxing handwritten bills, contracts, etc. , Scan to the computer through the camera of the fax machine, and send them in the format of fax through the simple operation of the computer software, which is easy to use and flexible to operate; the communication interface adopts the USB HID protocol to improve reliability and compatibility.

[0014]

90 Description of drawings

[0015]

94 Figure 1 is a schematic diagram of the present invention.

[0016]

98 Detailed ways

[0017]

102 The utility model is further described in detail below in conjunction with the accompanying drawings:

[0018]

106 A USB digital fax machine with a camera as shown in Figure 1; it mainly includes a fax device and a digital camera module. The fax device includes a single-chip microcomputer and a Modem chip. Buttons and status control of LED indicators and buzzer.

[0019]

112 The PC is connected to the digital camera module and the fax device respectively, and after the image data is collected by the digital camera module and processed by the PC, it is input to the fax device and then transmitted through the fax device.

115 The digital camera module and the single-chip microcomputer are connected with the PC through the USB module; the data communication protocol of HID is adopted.

117 The function of the digital camera module is to transmit the image information of the data to be faxed to the PC through the USB chip.

119 After the image is processed by the PC, it is transmitted to the single-chip microcomputer in the form of fax data; the single-chip computer communicates with the Modem module, transmits the data to the Modem chip, and transmits the data through the telephone line.

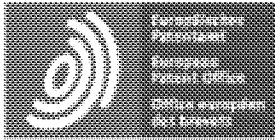
[0020]

<sup>125</sup> When the USB digital fax machine with camera is working, put the data to be faxed under the digital camera of the fax machine, the camera collects the image data and transmits it to the computer through the USB cable, and the user automatically converts the image to be faxed into the fax through the computer software. The file format, through the USB cable, the data is transmitted to the fax device, and the fax device automatically transmits the data.

[0021]

<sup>133</sup> Because the USB of the utility model adopts the HID protocol, the driver of the host computer is provided by the system, and there is no need to write the driver program by itself, the transmission speed is fast, and the compatibility is strong.

<sup>136</sup> The faxes sent and received by the digital fax machine are stored in the Flash chip of the fax machine, which can save paper, and the office cost is much lower than that of a paper fax machine, which can realize a paperless office.



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## CLAIMS CN202334692U

1.

<sup>13</sup> A USB digital facsimile machine with a camera, comprising a facsimile device, characterized in that: a digital camera module is arranged on the facsimile device, a PC is respectively connected with the digital camera module and the facsimile device, and image data is collected by the digital camera module and processed by the PC Then input it to the fax device for transmission.

2.

<sup>20</sup> The USB digital facsimile machine with camera according to claim 1, wherein the facsimile device comprises an MCU, the MCU is a single-chip microcomputer, and the single-chip microcomputer is communicated and connected with the PC via the USB module.

3.

<sup>26</sup> The USB digital facsimile machine with camera according to claim 2, characterized in that: the single-chip microcomputer is connected to the Modem chip for communication, and is used to send the picture file processed by the PC by fax.

4.

<sup>32</sup> A USB digital fax machine with a camera according to claim 1, wherein the digital camera module is connected to the PC via a USB module.

5.

<sup>37</sup> The USB digital facsimile machine with camera according to claim 1, characterized in that: HID data

communication is between the PC, the digital camera module and the single-chip microcomputer.



(19) 中华人民共和国国家知识产权局



## (12) 实用新型专利

(10) 授权公告号 CN 202334692 U

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(21) 申请号 201120491716.8

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(73) 专利权人 张银虎

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国道旁西成龙秋口工业园 A 栋五楼

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有限责任公司 11042

代理人 付晓青 杨玉荣

(51) Int. Cl.

H04N 1/00 (2006.01)

H04N 1/32 (2006.01)

H04N 5/225 (2006.01)

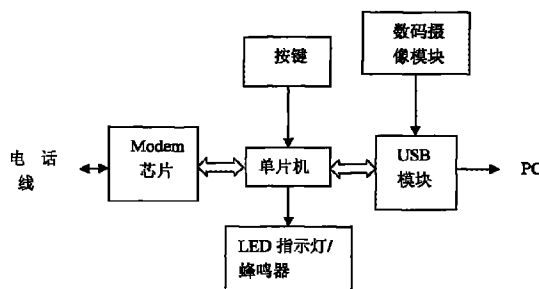
权利要求书 1 页 说明书 2 页 附图 1 页

(54) 实用新型名称

一种带摄像头的 USB 数码传真机

(57) 摘要

本实用新型公开了一种带摄像头的 USB 数码传真机,包括……传真设备,该传真设备上设置……数码摄像模块,PC 分别与数码摄像模块和传真设备连接,由数码摄像模块采集图像数据经 PC 处理后输入至传真设备传送;本实用新型把摄像功能和数码传真功能完美的结合起来,对于要传真手写的票据,合同等,通过传真机的摄像头扫描到电脑,通过电脑软件的简单操作,就可以把他们以传真的格式发出去,使用简单,操作灵活。通信接口采用 USB HID 协议,提高可靠性和兼容性。



CN 202334692 U

1. 一种带摄像头的 USB 数码传真机,包括一传真设备,其特征在于:该传真设备上设置一数码摄像模块,PC 分别与数码摄像模块和传真设备连接,由数码摄像模块采集图像数据经 PC 处理后输入至传真设备传送。

2. 根据权利要求 1 所述的一种带摄像头的 USB 数码传真机,其特征在于:所述的传真设备包括一 MCU,该 MCU 为一单片机,单片机经 USB 模块与 PC 通信连接。

3. 根据权利要求 2 所述的一种带摄像头的 USB 数码传真机,其特征在于:所述的单片机与 Modem 芯片进行通信连接,用以传真发送 PC 处理的图片文件。

4. 根据权利要求 1 所述的一种带摄像头的 USB 数码传真机,其特征在于:所述的数码摄像模块经 USB 模块与 PC 连接。

5. 根据权利要求 1 所述的一种带摄像头的 USB 数码传真机,其特征在于:所述的 PC 与数码摄像模块和单片机之间为 HID 数据通信。

## 一种带摄像头的 USB 数码传真机

### 技术领域

[0001] 本实用新型涉及传真机,尤其涉及的是一种兼具摄像功能的带摄像头的 USB 数码传真机。

### 背景技术

[0002] 目前,市场上的传真机可分为纸质传真机和数码传真机;纸质传真机收发都要以纸为媒介,还需要配备扫描仪等设备,成本高,纸张消耗大。但普通的数码传真机没有摄像扫描功能,如果要传真票据和合同等资料,还需要配置扫描仪或其他的外置辅助设备,电脑上还要有专有软件处理,这样使用不方便;还有一些数码传真机采用串口进行数据传输,传输速度低。

### 实用新型内容

[0003] 针对现有技术的不足,本实用新型把摄像功能和数码传真功能完美的结合起来,对于要传真手写的票据,合同等,通过传真机的摄像头扫描到电脑,通过电脑软件的简单操作,就可以把他们以传真的格式发出去,使用简单。

[0004] 为了实现上述目的,本实用新型采用以下技术方案:

[0005] 一种带摄像头的 USB 数码传真机,包括一传真设备,其特征在于:该传真设备上设置一数码摄像模块,PC 分别与数码摄像模块和传真设备连接,由数码摄像模块采集图像数据经 PC 处理后输入至传真设备传送。

[0006] 所述的传真设备包括一 MCU,该 MCU 为一单片机,单片机经 USB 模块与 PC 通信连接。

[0007] 所述的单片机与 Modem 芯片进行通信连接,用以传真发送 PC 处理的图片文件。

[0008] 数码摄像模块经 USB 模块与 PC 连接。

[0009] 所述的 PC 与数码摄像模块和单片机之间为 HID 数据通信。

[0010] 采用上述方案后的带摄像头的 USB 数码传真机,把要传真的资料放在传真机的数码摄像头下,摄像头采集图像数据并通过 USB 线传给电脑,用户通过电脑软件自动把要传真的图像转化为传真的文件格式,通过 USB 线,把资料传给传真设备,由传真设备自动把资料传输出去;本实用新型把摄像功能和数码传真功能完美的结合起来,对于要传真手写的票据,合同等,通过传真机的摄像头扫描到电脑,通过电脑软件的简单操作,就可以把他们以传真的格式发出去,使用简单,操作灵活;通信接口采用 USB HID 协议,提高可靠性和兼容性。

### 附图说明

[0011] 图 1 是本实用新型的原理图。

### 具体实施方式

[0012] 下面结合附图对本实用新型进一步的详细说明：

[0013] 如图 1 的一种带摄像头的 USB 数码传真机；主要包括传真设备和数码摄像模块，传真设备包括一单片机和 Modem 芯片，单片机和 Modem 芯片进行通信，用以管理传真的收发和存储，并处理按键和 LED 指示灯和蜂鸣器的状态控制。

[0014] 利用 PC 分别与数码摄像模块和传真设备连接，经由数码摄像模块采集图像数据经过 PC 的处理后，输入传真设备再过经传真设备传送。数码摄像模块和单片机经 USB 模块与 PC 连接，采用 H I D 的数据通信协议。其中的数码摄像模块的功能是把要传真的资料的图像信息通过 USB 芯片传给 PC 机。由 PC 机把图像处理后，以传真的数据格式传给单片机；单片机与 Modem 模块进行通信，把数据传给 Modem 芯片，通过电话线把数据传出去。

[0015] 带摄像头的 USB 数码传真机工作时，把要传真的资料放在传真机的数码摄像头下，摄像头采集图像数据并通过 USB 线传给电脑，用户通过电脑软件自动把要传真的图像转化为传真的文件格式，通过 USB 线，把资料传给传真设备，由传真设备自动把资料传输出去。

[0016] 由于本实用新型的 USB 采用 HID 协议，上位机的驱动是系统自带的，不用自己写驱动程序，传输速度快，兼容性强。数码传真机收发传真都保存到传真机的 Flash 芯片中，可以节约纸张，办公成本比纸式传真机低很多，可以实现办公无纸化。

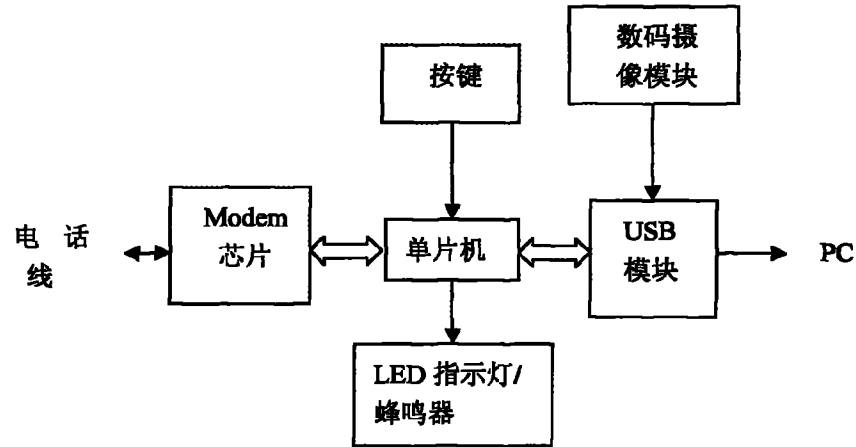


图 1

Doc code: IDS

PageID #: 4418

PTO/SB/08a (03-15)

Doc description: Information Disclosure Statement (IDS) Filed

Approved for use through 07/31/2016. OMB 0651-0031  
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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	16852790
	Filing Date	2020-04-20
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	BARTELS
	Attorney Docket Number	21063.0005USC1

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	1	202334692	CN	U	2012-07-11		With English translation	×

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**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number		16852790
Filing Date		2020-04-20
First Named Inventor	Koen Simon Herman BEEL	
Art Unit	2184	
Examiner Name	BARTELS	
Attorney Docket Number	21063.0005USC1	

1	USB Video device class, wikipedia, last edited on 11 September 2011.	
2	Wireless USB, Wikipedia, dated 29 August 2011.	
3	Wireless Universal Serial Bus Specification, Agere Systems, Inc., Hewlett-Packard Company, Intel Corporation, Microsoft Corporation, NEC Corporation, Koninklijke Philips Electronics, N.V., Samsung Electronics Co., Ltd, May 12, 2005.	
4	Kensington Wireless USB Docking Station, by Nicole Price Fasig, October 22, 2008.	
5	LOGEAR Installation Guide, Wireless Audio Video Kit, 2009.	
6	Office Action issued in corresponding Chinese Application No. 202010418842.4, dated March 25, 2022, with English translation	×
7	Communication issued in European Application No. 16207123.7, dated February 25, 2022	<input type="checkbox"/>

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**EXAMINER SIGNATURE**

Examiner Signature		Date Considered	
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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.



Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	BARTELS
Attorney Docket Number	21063.0005USC1

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-05-25
Name/Print	Thomas Lee	Registration Number	66,396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

**Electronic Patent Application Fee Transmittal**

<b>Application Number:</b>	16852790			
<b>Filing Date:</b>	20-Apr-2020			
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS			
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel			
<b>Filer:</b>	Thomas Lee			
<b>Attorney Docket Number:</b>	21063.0005USC1			
Filed as Large Entity				
<b>Filing Fees for Utility under 35 USC 111(a)</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
PETITION FEE- 37 CFR 1.17(H) (GROUP III)	1464	1	140	140
RCE- 2ND AND SUBSEQUENT REQUEST	1820	1	2000	2000
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				2140

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[www.uspto.gov](http://www.uspto.gov)

Decision Date : May 25, 2022

In re Application of :

Koen Simon Herman Beel

DECISION ON PETITION

UNDER CFR 1.313(c)(2)

Application No : 16852790

Filed : 20-Apr-2020

Attorney Docket No : 21063.0005USC1

This is an electronic decision on the petition under 37 CFR 1.313(c)(2), filed May 25, 2022 , to withdraw the above-identified application from issue after payment of the issue fee.

The petition is **GRANTED**.

The above-identified application is withdrawn from issue for consideration of a submission under 37 CFR 1.114 (request for continued examination). See 37 CFR 1.313(c)(2).

**Petitioner is advised that the issue fee paid in this application cannot be refunded. If, however, this application is again allowed, petitioner may request that it be applied towards the issue fee required by the new Notice of Allowance.**

Telephone inquiries concerning this decision should be directed to the Patent Electronic Business Center (EBC) at 866-217-9197.

This application file is being referred to Technology Center AU 2184 for processing of the request for continuing examination under 37 CFR 1.114 .

Office of Petitions

**Electronic Acknowledgement Receipt**

<b>EFS ID:</b>	45807072
<b>Application Number:</b>	16852790
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	5321
<b>Title of Invention:</b>	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
<b>First Named Inventor/Applicant Name:</b>	Koen Simon Herman Beel
<b>Customer Number:</b>	52835
<b>Filer:</b>	Thomas Lee
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	21063.0005USC1
<b>Receipt Date:</b>	25-MAY-2022
<b>Filing Date:</b>	20-APR-2020
<b>Time Stamp:</b>	23:10:55
<b>Application Type:</b>	Utility under 35 USC 111(a)

**Payment information:**

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$2140
RAM confirmation Number	E20225ON10454070
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	ePetition Request Form	petition-request.pdf	39850	no	2
			d9569d8a4381c7f34eff50757f03d834acb32832		
Warnings:					
Information:					
2	Quick Path Information Disclosure Statement	QPIDS_0005USC1.pdf	369233	no	2
			a64107f77f3bae0c11fe50e3ee4ce66b1d741cf4		
Warnings:					
Information:					
3	Request for Continued Examination (RCE)	RCE_0005USC1.pdf	1667175	no	3
			195887dfc38fc24eca12a5572c6eec2ee4b6d8c7		
Warnings:					
Information:					
4	Non Patent Literature	NPL5_IOGEAR_Installation_guide_Wireless_Audio-video_kit.pdf	9571336	no	80
			6f04b4783a0ee5be0a839909512a1604c4cbad26		
Warnings:					
Information:					
5	Non Patent Literature	NPL4_Kensington_Wireless_US B_Docking_Station.pdf	261983	no	6
			f3780ba393000fccb4e6a5349e7845057eca2fa5		
Warnings:					
Information:					
6	Non Patent Literature	NPL3_Wireless_Universal_Serial_Bus_Specification.pdf	1472543	no	37
			356f7a481953dc04b503337c3b327df564f08c88		
Warnings:					
Information:					

7	Non Patent Literature	NPL2_Wireless_USB_Wikipedia.pdf	469947 080dff9525bc1359a322106436a587a3cb88feb2	no	6
Warnings:					
Information:					
8	Non Patent Literature	NPL1_USB_Video_Device_Class.pdf	168525 f4d2385d3c1b6e97565f4c6faab2d9c66b87d326	no	3
Warnings:					
Information:					
9	Non Patent Literature	NPL6_OA_CN.pdf	5488312 f0f584527b6c4b25d3222821dc8a2d6d5990f6d1	no	13
Warnings:					
Information:					
10	Non Patent Literature	NPL7_EPOA.pdf	89863 f2af009ff04d320003ba4df3d6a377dd1a13d58	no	4
Warnings:					
Information:					
11	Foreign Reference	FR1_CN202334692U.pdf	3892374 c2b36420b50e6b44d5153ba7eea9c88a7c3f1b11	no	11
Warnings:					
Information:					
12	Quick Path Information Disclosure Statement	SB08_0005USC1.pdf	1035616 eab4ebd026993c26d0e9b7b1cf89ee0cb62e3ab2	no	4
Warnings:					
Information:					
13	Fee Worksheet (SB06)	fee-info.pdf	40465 b1e8a5a8e014198598277f464faefd24beaae86e	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			24567222		



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**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc Code: PET.AUTO

Document Description: Petition automatically granted by EFS-Web

U.S. Patent and Trademark Office  
Department of Commerce

Electronic Petition Request	<b>PETITION TO WITHDRAW AN APPLICATION FROM ISSUE AFTER PAYMENT OF THE ISSUE FEE UNDER 37 CFR 1.313(c)</b>
Application Number	16852790
Filing Date	20-Apr-2020
First Named Inventor	Koen Beel
Art Unit	2184
Examiner Name	
Attorney Docket Number	21063.0005USC1
Title	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

An application may be withdrawn from issue for further action upon petition by the applicant. To request that the Office withdraw an application from issue, applicant must file a petition under this section including the fee set forth in § 1.17(h) and a showing of good and sufficient reasons why withdrawal of the application from issue is necessary.

APPLICANT HEREBY PETITIONS TO WITHDRAW THIS APPLICATION FROM ISSUE UNDER 37 CFR 1.313(c).

A grantable petition requires the following items:

- (1) Petition fee; and
- (2) One of the following reasons:
  - (a) Unpatentability of one or more claims, which must be accompanied by an unequivocal statement that one or more claims are unpatentable, an amendment to such claim or claims, and an explanation as to how the amendment causes such claim or claims to be patentable;
  - (b) Consideration of a request for continued examination in compliance with § 1.114 (for a utility or plant application only); or
  - (c) Express abandonment of the application. Such express abandonment may be in favor of a continuing application, but not a CPA under 37 CFR 1.53(d).

#### Petition Fee

☐ Small Entity

☐ Micro Entity

☒ Regular Undiscounted

Reason for withdrawal from issue

- ☐ One or more claims are unpatentable
- ☒ Consideration of a request for continued examination (RCE) (List of Required Documents and Fees)
- ☐ Applicant hereby expressly abandons the instant application (any attorney/agent signing for this reason must have power of attorney pursuant to 37 CFR 1.32(b)).

RCE request, submission, and fee.

- ☐ I certify, in accordance with 37 CFR 1.4(d)(4) that :
- ☐ The RCE request ,submission, and fee have already been filed in the above-identified application on
- ☒ Are attached.

THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:

- ☒ An attorney or agent registered to practice before the Patent and Trademark Office who has been given power of attorney in this application.
- ☐ An attorney or agent registered to practice before the Patent and Trademark Office, acting in a representative capacity.
- ☐ A sole inventor
- ☐ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application
- ☐ A joint inventor; all of whom are signing this e-petition

Signature	/Thomas Lee/
Name	Thomas Lee
Registration Number	66396

Doc Code: QPIDS.REQ

Document Description: Quick Path Information Disclosure Statement

PTO/SB/09 (12-16)

**CERTIFICATION AND REQUEST FOR CONSIDERATION OF AN INFORMATION DISCLOSURE  
STATEMENT FILED AFTER PAYMENT OF THE ISSUE FEE UNDER THE QPIDS PILOT PROGRAM**Non-Provisional Application Number: **16/852790**Filing Date: **2020-04-20**First Named Inventor: **Koen Simon Herman BEEL**Title of Invention: **ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS****THE UNDERSIGNED HEREBY CERTIFIES AND REQUESTS THE FOLLOWING FOR THE ABOVE-  
IDENTIFIED APPLICATION.**

- Consideration is requested of the information disclosure statement (IDS) submitted herewith, which is being filed after payment of the issue fee.
- Check the box next to the appropriate selection:
 

☒ Each item of information contained in the IDS was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the IDS. See 37 CFR 1.97(e)(1).

**OR**

☐ No item of information contained in the IDS was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the IDS was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the IDS. See 37 CFR 1.97(e)(2).

**OR**

☐ See attached certification statement in compliance with 37 CFR 1.97(e).
- Please charge the IDS fee set forth in 37 CFR 1.17(p) to Deposit Account No. 503478.
- A Petition to Withdraw from Issue After Payment of the Issue Fee (37 CFR 1.313(c)(2)), including the petition fee set forth in 37 CFR 1.17(h), is submitted herewith as a **Web-based ePetition**.  
**WARNING:** Do not submit the petition as a follow-on paper via EFS-Web. Submit the petition as a Web-based ePetition by signing on to EFS-Web as a registered user, selecting the radio button next to "Existing application/patent," and then selecting the radio button next to "ePetition (for automatic processing and immediate grant, if all petitions requirements are met)." Failure to use the Web-based ePetition interface will result in automatic entry of the RCE.
- A request for continued examination (RCE) under 37 CFR 1.114 and the RCE fee under 37 CFR 1.17(e) are submitted herewith.
- The RCE will be treated as a "conditional" RCE. In the event the examiner determines that any item of information contained in the IDS necessitates the reopening of prosecution in the application, the undersigned understands that (i) the RCE will be processed and treated as an RCE under 37 CFR 1.114 and therefore (ii) the IDS fee under 37 CFR 1.17(p) will be returned in accordance with 37 CFR 1.97(b)(4). In the event that no item of information in the IDS necessitates reopening prosecution, the undersigned understands that the RCE will not be processed and the RCE fee under 37 CFR 1.17(e) will be returned.
- This certification and request is being filed as a **Web-based ePetition** and is not accompanied by an amendment to the application. Inclusion of an amendment will result in automatic entry of the RCE.

Signature /Thomas Lee/Date **May 25, 2022**Name  
(Print/Typed) **THOMAS LEE**Practitioner  
Registration Number **66396**  
(If applicable)

**Note:** Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below.\*

☐ \*Total of \_\_\_\_\_ forms are submitted.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

## Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/852,790	06/14/2022	11360913	21063.0005USC1	5321

52835

7590

05/25/2022

HAMRE, SCHUMANN, MUELLER & LARSON, P.C.  
45 South Seventh Street  
Suite 2700  
Minneapolis, MN 55402-1683

## ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

### **Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)** (application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

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**INVENTOR(s)** (Please see PAIR WEB site <http://pair.uspto.gov> for additional inventors):

Koen Simon Herman Beel, Eke, BELGIUM;  
Yoav Nir, Komen, BELGIUM;  
Filip Josephine Johan Louwet, Knesselare, BELGIUM;  
Guy Coen, Aalst, BELGIUM;

**APPLICANT(s)** (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

BARCO N.V., Kortrijk, BELGIUM;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit [SelectUSA.gov](http://SelectUSA.gov).

**United States Patent and Trademark Office***Office of the Chief Financial Officer*

Document Code:WFEE

User :75320

Sale Accounting Date:05/27/2022

Sale Item Reference Number

16852790

Effective Date

05/25/2022

Document Number

I20225QB24404561

Fee Code

1806

Fee Code Description

SUBMISSION- INFORMATION  
DISCLOSURE STMT

Amount Paid

\$260.00

Payment Method

Deposit Account



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/852,790	04/20/2020	Koen Simon Herman Beel	21063.0005USC1	5321
52835	7590	06/29/2022		
HAMRE, SCHUMANN, MUELLER & LARSON, P.C. 45 South Seventh Street Suite 2700 Minneapolis, MN 55402-1683			EXAMINER BARTELS, CHRISTOPHER A.	
			ART UNIT	PAPER NUMBER
			2184	
			NOTIFICATION DATE	DELIVERY MODE
			06/29/2022	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTOMail@hsml.com



<b>Corrected</b> <b>Notice of Allowability</b>	<b>Application No.</b> 16/852,790	<b>Applicant(s)</b> Beel et al.	
	<b>Examiner</b> CHRISTOPHER A BARTELS	<b>Art Unit</b> 2184	<b>AIA (FITF) Status</b> No

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 05/25/2022.  
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 82-101. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a) ☐ All      b) ☐ Some\*      c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.  
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. <input type="checkbox"/> Notice of References Cited (PTO-892) 2. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>05/25/2022</u> . 3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material _____. 4. <input type="checkbox"/> Interview Summary (PTO-413), Paper No./Mail Date. _____.	5. <input type="checkbox"/> Examiner's Amendment/Comment 6. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance 7. <input type="checkbox"/> Other _____.
--	---

/C.A.B/ Examiner, Art Unit 2184	/HENRY TSAI/ Supervisory Patent Examiner, Art Unit 2184
------------------------------------	--

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PageID #: 4437

PTO/SB/08a (03-15)

Approved for use through 07/31/2016. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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# **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** ( Not for submission under 37 CFR 1.99)

Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	BARTELS
Attorney Docket Number	21063.0005USC1

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Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2i</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
/C.A.B/	1	202334692	CN	U	2012-07-11		With English translation	×

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	BARTELS
Attorney Docket Number	21063.0005USC1

/C.A.B/	1	USB Video device class, wikipedia, last edited on 11 September 2011.	
/C.A.B/	2	Wireless USB, Wikipedia, dated 29 August 2011.	
/C.A.B/	3	Wireless Universal Serial Bus Specification, Agere Systems, Inc., Hewlett-Packard Company, Intel Corporation, Microsoft Corporation, NEC Corporation, Koninklijke Philips Electronics, N.V., Samsung Electronics Co., Ltd, May 12, 2005.	
/C.A.B/	4	Kensington Wireless USB Docking Station, by Nicole Price Fasig, October 22, 2008.	
/C.A.B/	5	LOGEAR Installation Guide, Wireless Audio Video Kit, 2009.	
/C.A.B/	6	Office Action issued in corresponding Chinese Application No. 202010418842.4, dated March 25, 2022, with English translation	×
/C.A.B/	7	Communication issued in European Application No. 16207123.7, dated February 25, 2022	<input type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button

Add

**EXAMINER SIGNATURE**

Examiner Signature	/CHRISTOPHER A BARTELS/	Date Considered	06/23/2022
--------------------	-------------------------	-----------------	------------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

Application Number	16852790
Filing Date	2020-04-20
First Named Inventor	Koen Simon Herman BEEL
Art Unit	2184
Examiner Name	BARTELS
Attorney Docket Number	21063.0005USC1

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**  
( Not for submission under 37 CFR 1.99)

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2022-05-25
Name/Print	Thomas Lee	Registration Number	66,396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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**United States Patent and Trademark Office***Office of the Chief Financial Officer*

Document Code:WFEE

User :Simret Direta

Refund Accounting Date:07/13/2022

Effective Date	Sale Item Reference Number	Refund Total
05/25/2022	16852790	\$2,000.00

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method	Account Number
I20227CF19421570	1820	RCE- 2ND AND SUBSEQUENT REQUEST	\$2,000.00	DA	503478

**United States Patent and Trademark Office***Office of the Chief Financial Officer*

Document Code:WFEE

User :Simret Direta

Sale Adjustment Accounting Date:07/13/2022

Effective Date	Sale Accounting Date	Sale Item Reference Number
05/25/2022	07/13/2022	16852790

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/852,790	08/02/2022	11403237	21063.0005USC1	5321

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07/13/2022

HAMRE, SCHUMANN, MUELLER &amp; LARSON, P.C.

45 South Seventh Street

Suite 2700

Minneapolis, MN 55402-1683

## ISSUE NOTIFICATION

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**INVENTOR(s)** (Please see PAIR WEB site <http://pair.uspto.gov> for additional inventors):

Koen Simon Herman Beel, Eke, BELGIUM;

Yoav Nir, Komen, BELGIUM;

Filip Josephine Johan Louwet, Knesselare, BELGIUM;

Guy Coen, Aalst, BELGIUM;

**APPLICANT(s)** (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

BARCO N.V., Kortrijk, BELGIUM;

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